

ALASKA RETIREMENT MANAGEMENT BOARD

MARCH
18-19, 2021

BOARD OF TRUSTEES MEETING

TELECONFERENCE: 1-907-202-7104
MARCH 18TH ACCESS CODE: 959 385 790#
MARCH 19TH ACCESS CODE: 721 354 249#

THURSDAY, MARCH 18, 2021

- I. 9:00 am Call to Order
- II. Roll Call
- III. Public Meeting Notice
- IV. Approval of Agenda
- V. Public/Member Participation, Communications, and Appearances
(Three Minute Limit)
- VI. Approval of Minutes – December 3-4, 2020
- VII. 9:15 am Staff Reports
 - A. Retirement & Benefits Division Report
 - 1. Membership Statistics (Informational)
 - 2. Buck Invoices (Informational)
 - 3. Legislative Update

Ajay Desai, Director, Division of Retirement & Benefits
Kevin Worley, CFO, Division of Retirement & Benefits
 - B. Treasury Division Report
Pamela Leary, Director, Division of Treasury
 - C. Liaison Report
 - 1. Disclosures Report
 - 2. Communication Report
 - 3. Remaining 2021 & Draft 2022 ARMB Meeting Schedule

Alysia Jones, ARMB Liaison
 - D. CIO Report
Zachary Hanna, Chief Investment Officer
 - E. Fund Financial Presentation
Kayla Wisner, State Comptroller
Kevin Worley, CFO, Division of Retirement & Benefits
- VIII. 10:00 am Trustee & Legal Reports
 - A. Chair Report, *Rob Johnson*

B. Committee Reports

1. Audit Committee, *Gayle Harbo, Chair*
2. Actuarial Committee, *Allen Hippler, Chair*
3. DC Plan Committee, *Bob Williams, Chair*
4. Operations Committee, *Rob Johnson, Chair*
5. Alaska Retiree Health Plan Advisory Board, *Lorne Bretz, ARMB Member*

C. Legal Report, *Stuart Goering, ARMB Legal Counsel*

10:30AM – 10 MINUTE BREAK

IX. 10:40 am Presentations

- | | | |
|---------------|----|--|
| 10:40 - 11:25 | A. | Buck Update, DRAFT June 30, 2020 Actuarial Reports, & Experience Study Timeline
<i>David Kershner & Scott Young, Buck</i> |
| 11:25 - 11:45 | B. | GRS Draft Actuary Certification
<i>Paul Wood & Bill Detweiler, GRS & Co.</i> |

LUNCH – 11:45AM - 1:00PM

- | | | |
|-------------|----|---|
| 1:00 - 1:20 | C. | 57 Years of Investing: Some Observations
<i>Dr. Jerry Mitchell, Investment Advisory Council Member</i> |
| 1:20 – 2:20 | D. | Performance Measurement – 4th Quarter
<i>Paul Erlendson and Steve Center, Callan LLC</i> |
| 2:20 - 3:00 | E. | Fidelity Signaling Investment Review
<i>Cathy Pena, Portfolio Manager</i>
<i>Kristin Shofner, Senior Vice President, Business Development</i> |
- ARMB Staff Action Memo:** Fidelity Signaling Benchmark Change and Portfolio Enhancements

3:00 PM – 10 MINUTE BREAK

- | | | |
|-------------|----|-------------------|
| 3:10 – 4:10 | F. | Executive Session |
|-------------|----|-------------------|

FRIDAY, MARCH 19, 2021

9:00 – 9:40 G. Brexit and International Equities – Baillie Gifford
Gerard Callahan, Investment Manager
Eoin Anderson, Client Service Manager

9:40 – 10:20 H. China and International Equities – Capital Group
Michael A. Bowman, Senior Business Development Manager
Steve Caruthers, Equity Investment Director
Gerald Du Manoir, Equity Portfolio Manager
Kelly McKale, Client Relationship Manager

10:20- 11:00 I. Crestline Specialty Lending Fund Review
Keith Williams, Managing Partner, Credit Strategies

ARMB Staff Action Memo: Crestline Special Lending Fund III

11:00AM – 10 MINUTE BREAK

11:10 – 11:45 J. PineBridge Investment Review
Michael Kelly, Global Head of Multi Asset
Deanne Nezas, Portfolio Manager, Multi Asset

ARMB Staff Action Memo: PineBridge Benchmark Change

LUNCH – 11:45AM - 1:00PM

1:00 – 2:00 K. Capital Markets Assumptions – Callan LLC
Jay Kloepfer, Executive Vice President and Director, Capital Market Research
Adam Lozinski, Assistant Vice President, Capital Market Research

2:00 – 2:20 L. Risk Management
Shane Carson, State Investment Officer

2:20PM – 10 MINUTE BREAK

- 2:30 M. Investment Discussion and Action Items
1. IAC Re-Appointment
 2. Deferred Action Items
 - a. ARMB Actuarial Committee Charter
 - b. Actuary Review Contract – Optional Renewal
 - c. ARMB Third Actuary Audit Procurement
- Zachary Hanna, Chief Investment Officer*
Pamela Leary, Director, Division of Treasury
- XII. 3:00 pm Unfinished Business**
- XIII. New Business**
- A. Actuarial Committee Membership
- XIV. Other Matters to Properly Come Before the Board**
- XV. Public/Member Comments**
- XVI. Investment Advisory Council Comments**
- XVII. Trustee Comments**
- XVIII. Future Agenda Items**
- XIX. Adjournment**

NOTE: Times are approximate, every attempt will be made to stay on schedule; however, adjustments may be made.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
BOARD OF TRUSTEES MEETING

Videoconference

MINUTES OF
December 3-4, 2020

Thursday, December 3, 2020

I. CALL TO ORDER

CHAIR JOHNSON called the meeting of the Alaska Retirement Management Board to order at 9:02 a.m.

II. ROLL CALL

Nine ARMB trustees were present at roll call to form a quorum.

Board Members Present

Robert Johnson, *Chair*
Bob Williams, *Vice-Chair*
Gayle Harbo, *Secretary*
Lorne Bretz
Allen Hippler
Commissioner Lucinda Mahoney
Commissioner Kelly Tshibaka
Dennis Moen
Michael Collins

Board Members Absent

None

Investment Advisory Council Present:

Dr. William Jennings
Dr. Jerrold Mitchell
Ruth Ryerson

Department of Revenue Staff Present:

Zachary Hanna, *Chief Investment Officer*
Pamela Leary, *Director, Treasury Division*
Mike Barnhill, *Deputy Commissioner*
Kayla Wisner, *State Comptroller*
Scott Jones, *Head of Investment Operations, Performance & Analytics*

Michelle Prebula, Public Equity & DC Investment Officer
Sean Howard, Portfolio Manager Alternatives
Steven Sikes, State Investment Officer
Shane Carson, State Investment Officer
Casey Colton, State Investment Officer
Victor Djajalie, State Investment Officer
Kevin Elliot, State Investment Officer
Mark Moon, State Investment Officer
Ryan Kauzlarich, Accountant V

Hunter Romberg, Investment Data Analyst
Grant Ficek, Business Analyst
Alysia Jones, Board Liaison

Department of Administration Staff Present:

Kevin Worley, Chief Financial Officer, Division of Retirement and Benefits
Ajay Desai, Director, Division of Retirement and Benefits
James Puckett, Deputy Director, Division of Retirement and Benefits
Emily Ricci, Chief Health Administrator, Division of Retirement and Benefits

ARMB Legal Counsel Present:

Stuart Goering, Assistant Attorney General, Department of Law

Others Present:

Paul Erlendson, Callan
Steve Center, Callan
Gary Robertson, Callan
David Kershner, Buck
Scott Young, Buck
Tonya Manning, Buck
Paul Wood, Gabriel Roeder Smith
Bill Detweiler, Gabriel Roeder Smith
Melissa Beedle, KPMG
Beth Stuart, KPMG
Joel Whidden, Bridgewater
Patrick Dimick, Bridgewater
Frank Reid, Special Agent, FBI
Doug Woodby, Public
Bob Schroeder, Public
Jim Simard, Public
Michael Tobin, Public
Nils Andreassen, Public
Benjamin Garrett, Public
Josh McLin, Public
Bob Mitchell, Public
Tom Brice, Public

III. PUBLIC MEETING NOTICE

MS. JONES confirmed that public meeting notice requirements had been met.

CHAIR JOHNSON introduced new additions to the ARM Board family. MR. COLLINS, from Wasilla, who replaced NORM WEST, and MS. JONES, the liaison officer.

IV. APPROVAL OF AGENDA

MS. HARBO moved to approve the agenda. MR. WILLIAMS seconded the motion. The agenda was approved without objection.

CHAIR JOHNSON stated that as a correction to the agenda, MS. HARBO is now Chair of the Audit Committee, and MR. HIPPLER is now Chair of the Actuarial Committee.

V. PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS & APPEARANCES

DOUG WOODBY stated that he is a member of 350Juneau and has spoken to the Board many times in the past about the fiduciary risk of the climate crisis. He stated the fossil fuel industry, through Exxon's own research, was aware of the direct link between burning fossil fuel and the greenhouse effect. He stated that Exxon, along with many of the major producers, began a disinformation campaign to spread doubt about the science. He said it is now known that it is best to leave the majority of proven reserves in the ground to avoid the worst climate impacts. He said that Exxon just announced a \$20 billion write-off, and that announcement followed similar announcements by BP, Shell, and Total earlier in the year. He suggested for the Board to take actions on determining the exposure across all asset classes, which would include identifying those investments that are not directly fossil fuel enterprises, but closely related and dependent on them. He said that would include banks who loaned substantial amounts of money to the industry, and to conduct a climate risk analysis across all those asset classes, and to also move funds to less risky investments if the risk analysis points in that direction.

BOB SHROEDER said that he had testified before the Board several times to urge the Board to examine its fossil fuel holdings and other investments that prop up the declining fossil fuel extraction industry. He said that his conclusion some years ago was that investing in fossil fuels was a bad financial bet. He said that he had divested his personal funds to avoid losing money and to be on the right side of the transition to a carbon-neutral economy and that betting on the fossil fuel industry will lose money in the near term as the industry inevitably declines. He stated that at last count, worldwide 1,246 funds and organizations have divested \$14 trillion in assets from fossil fuels and that Bank of America announced that it is joining Wells Fargo, J.P. Morgan Chase, Goldman Sachs, City Bank, and Morgan Stanley in making commitments to stop funding for Arctic oil and gas projects. He said that he was dismayed that ARMB does not know on a real-time basis what its specific holdings are, and that ARMB does not closely track performance in the energy

sector. He said that ARMB deserves to know, and Alaskans need to be able to see how their investments are doing over time.

JIM SIMARD said that in the continuing absence of adequate executive or legislative action, there now was a growing second wave of climate-related litigation. He said that dozens of new lawsuits were making their way through the state courts as tort cases or public nuisance suits. He said many of these suits were brought by states and municipalities seeking reimbursement for the cost of mitigating climate-related damages. He said that Federal District Court Judge William Smith summarized the supporting evidence in these cases in his opinion remanding back to the state court of Rhode Island's tort case which had been filed against 21 fossil fuel companies stating that "Climate change is expensive, and the state wants help to pay for it, specifically from defendants in this case, who together have extracted, advertised, and sold a substantial percentage of the fossil fuels burned globally since the 1960s. This activity has released an immense amount of greenhouse gas in the earth's atmosphere, changing its climate and leading to all kinds of displacement, death, extinction, and destruction."

MR. SIMARD urged the Board to consider the probability that fossil fuel companies be held financially liable for damages caused by their past actions.

MICHAEL TOBIN said that in 2018, California SB 964 required companies to factor in climate-related risk in their portfolios and report progress on that and on meeting the Paris Climate Agreement goals every three years. He said the first report came out in December of 2019, and they found out that 20 percent of their investments were in sectors vulnerable to the fiscal aspects of climate change. He said those sectors included energy, forestry, transportation, food, and agriculture. He said that the CalPERS report noted that in addition to physical risk, like floods, fires, stronger storms, and sea level rise, there were also, transition risks in moving to a low-carbon economy. He said shifts in the market, in policies, and in technologies can affect the financial success of existing business models and industries. He said the report also noted that as a long-term global investor, the concern in addressing climate change in the portfolio was vitally important in fulfilling the fiduciary duty to exercise prudence and care in managing members' assets.

MR. TOBIN said that the investment landscape was changing rapidly, and some climate-related risk was due to large asset managers, banks, pension funds, and insurance companies moving to align their investments with The Paris Agreement. He said that all six of the largest U.S. banks had released formal exclusion policies against funding Arctic drilling.

MR. TOBIN said that a formal climate risk assessment process was part of the Board's fiduciary duty and to institute a climate risk assessment process to avoid getting caught with the assets stranded.

NILS ANDREASSEN stated that lot of the discussions that occur at the ARM Board level were valuable to the employers who participate in the PERS and TRS systems, and requested that at least for municipal employers, that the municipal representative to the Board produce either a summary of Board action or an annual report based on that

representative's financial experience in terms of how ARM Board decisions and PERS actuarial assumptions or audits or requests to the legislature, might impact municipal budgets as they move forward. He said that as part of the Boards operational responsibilities and duties, feedback from the municipal representative back to those municipal employers would be beneficial and keep everyone fully apprised of the work of the ARM Board.

CHAIR JOHNSON said that it was an interesting concept and that communications with municipalities and other employers in the system is always something that should be encouraged. He suggested MR. BRETZ consider the request and encouraged municipal participants to attend the ARMB meetings and read their reports.

VI. APPROVAL OF MINUTES: September 17 - 18, 2020

MR. HIPPLER moved to approve the minutes of the September 17-18, 2020 meeting. MS. HARBO seconded the motion. The minutes were approved without objection.

VII. ELECTION OF OFFICERS

MS. HARBO nominated ROB JOHNSON for Chair, BOB WILLIAMS for Vice-Chair and GAYLE HARBO for Secretary. MR. WILLIAMS seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

VIII. STAFF REPORTS

1. Retirement & Benefits Division Report

MR. WORLEY directed the Boards attention to page 41 of the packet which was the staff report for a summary of monthly billings, Buck Global LLC. He said they were through the first quarter of FY21 for the period ending September 30, 2021. He said that all the work that was listed was for valuation work or related to audit work that the Division performs that requires actuarial reports for pension and OPEB liabilities, as well as information related to GASB allocation schedules for employers participating in PERS and in TRS.

MS. HARBO and MR. WORLEY discussed the work Segal performs and how much their annual contract was and how much comes out of the pension funds. MR. WORLEY said that he would see about providing the information.

MR. WORLEY directed their attention to the second report located on page 44 which was the Division's report on the membership activity for the first quarter ended September 30, 2020 which was first quarter FY21. He said that they saw a decrease in PERS and TRS Defined Benefit membership --200 in PERS and 4 for TRS -- increases in Defined Contribution membership, and an increase in PERS and TRS retirees for all tiers, just under 200 for PERS and just above 250 for TRS.

MR. WORLEY provided a correction on the membership statistics on page 46. He said the numbers were correct, just the labeling was incorrect. He said that where it said,

"Retirements 4th Quarter FY19," should be 4th Quarter FY20," and the same with the two lines below that. He said for September 30, 2020, a similar update was needed for the last three lines; instead of FY20 it should be FY21.

MR. WILLIAMS asked if they had seen more retirements due to the pandemic; MR. WORLEY said that he would have to check with the retirement section and would provide the response to MS. JONES to provide to the Board.

MR. WORLEY said that the final information item that he had was the FY22 Health Retirement Arrangement amount. He said that the amount for FY22 was going to be \$2,168.40. That if an employee in either the PERS or TRS HRA or DCR plans worked the entire year, they would get \$2,168.40 applied to their account, which is a 0.43 percent increase.

MR. WORLEY stated that the calculation established in statute under 39.30.370, which was the annual average compensation of all employees of all employers in both TRS and PERS, and it would then be 3 percent of that.

MS. HARBO stated that she appreciated the table with all the amounts from fiscal year 2008 to 2022; it was helpful to look at the percentage change in the annual amount.

MR. WORLEY said that they would be providing the interest that was earned on HRA for eligible member accounts for FY20. He said that by regulation, the Division must post that interest by January 15th of the year following the end of the fiscal year. He said that information would be posted to member accounts and available on the December 31, 2020 statements for eligible members of the Empower statements which would be out by the middle of January.

MR. DESAI added a comment to the question posed by MS. HARBO regarding the cost for the Segal actuary. He said that all costs that were paid for the Segal contracts came from the health trust fund since they perform strictly health related work. He said that all the actuarial work was completed by Buck, but there was no double work that was done by either Segal or Buck. Buck does obtain information from Segal for verification purposes for the work they do with Aetna, but all costs for Segal came from the health trust.

2. Disclosures/Communications/Calendar

MS. JONES stated that beginning page 53 of the packet was the disclosure, communications, and calendar update, and on page 54 was a list of disclosures for the third quarter. She said that on the following page was the communications report and that an updated version of the report had been provided.

MS. JONES said the communication log and report was something that was introduced at the September meeting. She said they had made two additions to the report, the first being correspondence sent by the Board and/or Chair. She said for this meeting there was a letter sent to former Trustee Norm West, that was included under the Chair Report later in the Board packet.

MS. JONES said the second addition was a section regarding public records requests, and the information was provided so the Board could see the type and volume of requests that were being received.

MS. JONES said the last item was the 2021 board meeting calendar. She said March was listed as telephonic, and they were hopeful that the remaining meetings would be in person but, that may require some reassessment as time goes on.

MS. HARBO said that Commissioner Tangeman wanted to have all the meetings in Juneau because he was located there, but since most of the Trustees reside in Anchorage, most of the travel would be eliminated if they had the meetings in Anchorage.

MS. HARBO said she knew that it was important to have MS. LEARY and MR. HANNA at the meetings, but most of the staff could give their five minute to half-hour presentations online, which would save a lot of travel expense for the Trustees.

CHAIR JOHNSON said he thought the discussion as to where they might have meetings when they get together was an important one to have in the back of their minds. He said that they all wanted to be optimistic and hoped that they have meetings in person together as soon as possible, wherever that may be.

CHAIR JOHNSON also wanted to make note for the Trustees that the log of communications that MS. JONES referred to, which was relating to communications from folks to the Board and any communications by the Board going out, was something that, going forward, would always be available to Board members.

3. CIO Report

MR. HANNA said that his first months as CIO had been busy. He said that he had been able to meet one-on-one with all the portfolio staff members and that the team was very solid. He also said that he was not currently planning on filling the deputy CIO role. He said that in the alternative investment area there were two senior staff members, SEAN HOWARD and SHANE CARSON who were ready to take on additional responsibilities. He also said that the equity and fixed income team would be involved in the direct evaluation of external managers in their respective areas as there were synergies that flowed from that. He said it was important to have the domain experts bring their best thinking to manage those portfolios.

MR. HANNA said that from an investment perspective, he was focusing much of his attention on asset allocation in the current market environment and mentioned presentations on private equity, fixed income, markets, and risk.

MR. HANNA said that item 2 was the Annual Manager Review which was held on November 4th. He said Callan started with a background presentation on equity factors since the ARM Board has significant factor exposure. He said they would be following up with staff on a specific analysis of the ARM Board's equity structure next year. He said that he anticipates that it will be in the timeframe of February, March, and April.

MR. HANNA said that they reviewed every manager in the ARM Board's portfolio and that the managers provided due diligence questionnaires to the group which were reviewed prior to the meeting. He said that staff and Callan then shared information on manager organization strategies, and they participated in a discussion with the IAC members. He also said that they intentionally do not keep a detailed record of the discussion to promote a candid discussion.

MR. HANNA stated that the CIO of Man's Alternative Risk Premia strategy, Keith Haydon, was expected to retire in February and that it had been a well-communicated transition, but given Mr. Haydon's central role in creating the strategy at Man, staff was considering placing Man on the watch list once that occurs.

MR. HANNA said that he then led a brief discussion on ARM Board risk levers in the current capital market conditions.

MR. HANNA said that they had discussed potential ARM Board educational topics, such as the China national debt relevance, diversity, and options in volatility, and oversight of the internal funds. He said that staff would keep these subjects in mind as they prepare future Board agendas.

MR. HANNA stated that the third item on the list was the watch list and that there were no managers currently on the watch list and they were not recommending that any managers be placed on the watch list at that time.

MR. HANNA said that items 4 through 6 were areas where they exercised the CIO delegation. He said in item 4 they transitioned to the securities lending versions of several SSGA passive equity funds, which was the World ex-U.S. fund and their emerging markets fund. He said that item 5 committed \$100 million to Neuberger Berman Secondary Fund V which was the ARM Board's third investment in a series of successful private equity funds. He said that in item 6 they approved the cross trade of less than \$1 million in securities from one account to other accounts managed by Schroders in the wind down of the insurance-linked investments with Schroders.

MR HANNA stated that Item 7 was a summary of the portfolio's rebalancing that took place in September and October, which could be seen on the second page of the CIO Report. He said overall, during this period, \$535 million was invested in fixed income which was funded largely by the sale of equities, which had increased in value with the market rebound. He said \$439 million of that was a combination of third quarter end rebalancing from equities to fixed income and to fund the monthly \$92 million pension payment.

MR. HANNA said that in late October they funded another \$92 million pension payment through equity sales and that they also conducted two internal rebalance transactions over that period to equalize the relative allocations across the plans that they manage.

4. Fund Financial Presentation

MS. WISNER stated that page 61 starts the financial report for the period ending October 31, 2020. As of Tuesday, December 1st, the total nonparticipant-directed assets was \$29.8 billion, with fiscal year-to-date income of \$3.5 billion, and a net withdrawal of \$250.5 million.

MS. HARBO asked if the funds managed internally had changed from \$14 billion she had as of the end of October; MS. WISNER said yes, and that as of yesterday, it was about \$14.7 billion and the difference was that when she had sent out the staff report, it had August quarterly statements for some of the internally managed funds and now that she had September statements.

MR. WORLEY said that his presentation started on page 88 and that on page 89 was the four months ending October 31, 2020. He said that they also had the one-month period shown on page 90 and that it was an expansion of the net number that was presented on Treasury's financials, at the request of the Board, to show what the contributions and expenditures were by fund. He said that the biggest requested item from the Board was participant-directed disbursements or refunds from the plans, and that information was noted and characterized on page 91.

MR. WORLEY said that the Supplemental Annuity Plan and Deferred Comp Plan both offer the CARES Act distributions with limits that were established by the Division. He said that they distributed just under \$20 million through October 31. He also said that the last table on page 91 was the Defined Benefit refunds by tier which was explained on page 92 and 93.

MR. HIPPLER asked if people wanted to roll over their Defined Contribution Plan to their new employer, if that would fall under separation from service, or the zero-dollar transfer to a qualifying plan line; MR. WORLEY said the information provided on the table was based on how the member fills out the form; if they checked it as a separation of service but then rolled money over, they would not know ahead of time what that was going to be so they would show it as a separation of service. He said that if a person informed them that they wanted to roll their money over, then it would show as a rollover.

MR. HIPPLER asked if that data was available as to how often it was happening. MR. WORLEY said that they could get that information from Empower; MR. WILLIAMS said that it was his understanding that the \$20 million in distributions for the CARES Act funds was authorization for people to pull money from their Deferred Comp or their SBS because of the pandemic, and that all of the \$20 million, none of which was subsidized, was to deal with an immediate need but was reducing future financial security; MR. WORLEY said that yes, they were pulling money out of their retirement to deal with the present situation.

MR. WILLIAMS said that had they not pulled the money out, it would have gained interest and would be there for them when they retired, but because they were pulling it out now, the \$20 million would not be there. MR. WORLEY said that there was a three-year repayment period within the CARES Act if they choose to put money back in.

IX. TRUSTEE & LEGAL REPORTS

1. Chair Report

CHAIR JOHNSON stated that since the last meeting in September he worked with staff to develop agendas, discussion topics and points.

CHAIR JOHNSON said that NORM WEST stepped down as one of the Trustees and read a letter to NORM WEST, thanking him for his four-plus years of service as a Trustee of the ARMB and how much he was appreciated and what a joy he had been to be around.

CHAIR JOHNSON said that MR. COLLINS from Wasilla was appointed Trustee and asked that MR. COLLINS say hello to the Board.

MR. COLLINS said that it was an honor and a privilege to have been appointed to such a prestigious Board and that he took the appointment in high regard.

2. Committee Reports

A. Audit Committee

MS. HARBO said that they had met yesterday and approved two sets of minutes. She said the second set of minutes was the special meeting that was held on October 12th to review the draft financial statements to be included in the CAFRs.

MS. HARBO congratulated the Division once again for being the recipient of the GFOA Certificate of Excellence for Financial Reporting, which they have received for the past 20 years.

MS. HARBO said that they had received a report from MS. BEEDLE and MS. STUART, of KPMG, and MR. WORLEY on the audited financial statements. She said that MR. WORLEY gave them information on the GASB Rules 68 and 75 regarding the schedules that had gone out to participating employers which involved 16 audits.

MS. HARBO said that they had a complete employer audit report from MS. HELMICK regarding working with employers around the state. She said that this had been a trying time for doing anything with audits, especially in-person audits due to limited travel, but they completed 10 out of 59 scheduled audits for FY20. She said that MS. HELMICK explained the different problems they ran into as they performed the audits, and how the audits save the plan money.

MS. HARBO said she gave an excellent review on how they go through the audits each year and rotate the multiple employers in the State of Alaska in both PERS and TRS, on a four-year cycle.

B. Actuarial Committee

MR. HIPPLER said that the Actuarial Committee went over some of the preliminary findings and that the lag in earnings on assets was greater than the liability gains that they realized, the liability gains being favorable changes on per capita claims costs.

MR. HIPPLER said that there was a discussion on the unknown impacts of the coronavirus

shutdowns on the economy as far as people requiring more medical care and deferment of medical care, with the implication that in the future it may be that deferred medical care would come to fruition, so it was an artificial decrease in costs. He said there were some liability gains that were realized, but all of them together did not equal the asset losses that were realized.

MR. HIPPLER noted that in the DCR Plan they were eliminating the .2 percent annual rate trend adjustment, which almost completely offset the per capita claims gains. He said this meant that it was likely that the future contribution rate would increase.

ACTION: Relating to ARMB Actuary Audit

MS. LEARY said that she was not aware that Segal had made the same recommendations, but she would check on it.

MS. HARBO asked if MR. GOERING had a comment on the motion.

CHAIR JOHNSON asked MS. HARBO if her question was going to MR. GOERING's original assessment that it was an appropriate action, or did she have a more specific question about finding a sole source procurement; MS. HARBO said that she wanted MR. GOERING's assurance that the sole source contract was okay because the administration had received public comment on other sole source contracts that had been issued.

MR. GOERING stated that 15 AAC 112.160(a) controlled the issue, and it was permissible for the Board to use a sole source contract under the circumstances. He said the regulation section in subsection (d) Paragraph 6 stated: If a person possessed a special expertise required to perform the specific professional service. He said that it seemed to be essentially what was being said, that GRS had a level of background with ARM Board's plans that caused them to have special expertise.

MR. GOERING said that MS. HARBO was correct when she said the executive branch in Alaska had been under a lot of scrutiny recently with sole source contracts, and although the ARM Board was exempt from the state procurement code under most circumstances, the statute that provides for that exemption requires the adoption of regulations which encourage competitive bidding.

MR. GOERING said that while it was permissible to do sole source, it was not mandatory and was within the Board's discretion. He said he strongly recommended that they make the written explanation of why the procurement was in the best interests of the beneficiaries a part of the record because that was what the regulations required.

MS. LEARY said that she had just gone through the Segal report and their recommendations were limited to the work that was performed by the primary actuary, which was Buck. She said there was no mention of Aon or GRS or the review of the actuary or either of the two recommendations that Aon had made.

MR. WILLIAMS asked MS. LEARY if they could assume that there would be no negotiations and that the sole source procurement would result in substantial savings to the State of Alaska; MS.

LEARY said that if they found that was not the case, they would bring it back to the Board for an RFP.

MS. TSHIBAKA said they had recently found through an assessment of their procurement systems throughout the state, that they could save \$23 million to \$87 million through competitive sourcing that they had not been doing because of sole source contracts and redundant procurement spending in their department. She said there was something to be said for doing competitive sourcing but one reason they would not do it was the need for expediency.

MR. GOERING said that a possible alternative to an RFP would be to permit the Board to advertise the intent to make a sole source award for the purpose of determining if other sources were reasonably available or interested in a procurement, which could be done in parallel with negotiations with GRS.

COMMISSIONER MAHONEY said that she liked MR. GOERING's recommendation to pursue an expression of interest at the same time they negotiate a sole source.

CHAIR JOHNSON suggested to MR. HIPPLER that as there was no need for a second, as the maker of the motion on behalf of the committee, to add that language.

MR. HIPPLER said that it would specify the language would be to direct staff to pursue a sole source procurement contract and concurrently manage an expression of interest process.

After discussion, it was decided that the action memo should direct staff to pursue a sole source procurement contract and concurrently manage an expression of interest process for an independent audit.

A roll call vote was taken, and the motion for the Actuarial Committee passed unanimously.

C. DC Plan Committee

MR. WILLIAMS said they had public testimony at the beginning of the meeting, expressing gratitude that there was going to be a brokerage window. He said there was also an expression of gratitude that the HRA interest had been calculated. He said there was a comment about the Municipality of Anchorage and the Anchorage School District having contracts with Empower for the 457 plan that were exclusive and so the school district could not have a contract with the State of Alaska 457 plan.

MR. WILLIAMS said they had a Treasury update from MR. HANNA, and one of the things they were thinking about on the committee was how do we ensure that the DC members, which are more than half of the membership, get the same expertise, quality and value that they were getting for Defined Benefit members.

MR. WILLIAMS said that they had seen over time, a reduction in fees in their Defined Benefit, and there was also a push to get those reductions in fees for their DC members.

MR. WILLIAMS said they had heard from MS. PREBULA and were assured of and given

numerous examples of where she had been vigilant about aggressively negotiating fees on behalf of DC members.

MR. WILLIAMS said they had heard from MR. PUCKETT about HB79, which was a bill that was likely to be introduced in the House about police and firefighters.

MR. WILLIAMS said they heard about the number of monthly meetings and appointments that had increased dramatically since COVID-19. He said the in-person meetings had stopped, but a lot appointments were based on people wanting to know how secure they were. He said there did not seem to be a huge spike in those asking for retirements, but also response to the CARES Act money that had been talked about previously, which authorized members to tap some their deferred compensation or SBS for immediate needs.

MR. WILLIAMS said they had heard testimony from Empower that was very encouraging. He said they had been getting things set up so that the SmartSpending investment plan that the committee and the Board had approved, can be implemented in a timely way and work through Empower.

MR. WILLIAMS said that they had public testimony a few meetings ago from a member that ~~want~~ to withdraw money from a specific fund. He said Empower had reduced the amount of paperwork that members had to fill out; they were training their representatives so they could fill out that form while on the phone with the member; they are also going to make it so that it can be accomplished online.

MR. WILLIAMS said they had a discussion with MR. WORLEY about the recordkeeping fees. He said some of their plans had a recordkeeping fee at 11 basis points, and Deferred Comp was at 17 basis points. He said he thought that was all going to Empower; but in reality, only some of it was going to Empower. He said some of the fees were going to Treasury and some were going to Admin and said that there needs to be clarification about what goes where.

MR. WILLIAMS said that with Deferred Comp there was a possibility to reduce the overall fee of 17 basis points. He said that one of the reasons the Anchorage School District and the Municipality set up a plan with Empower was for 15 basis points instead of 17 basis points. He said there had been a renegotiation with Empower on the recordkeeping fee from 7 basis points to 5.5 basis points and that difference did not result in a reduction of the overall fees for the plans; it was divided between Treasury and Admin. He said there should be further discussion on options to reduce the overall fees for those plans.

CHAIR JOHNSON said that unless there were objections, he would push the Operations Committee, the Alaska Retirement Health Plan Advisory Board process as well as MR. GOERING'S legal report to after the lunch break. He said hearing no objections they would next be hearing from Buck.

CHAIR JOHNSON recessed the meeting from 10:35 a.m. until 10:43 a.m.

X. PRESENTATIONS

1. Actuarial Presentation

MR. KERSHNER said that Slide 4 showed the preliminary results of the June 30, 2020 valuations for PERS and TRS and the results included both the Defined Benefit plans that covered employees who were active through June 30, 2006 and the DCR plans, which covered all hires on or after July 1, 2006. He said the valuations were prepared annually based on census and participant data they collect from DRB, as well as the claims and enrollment information received from Aetna and Optum.

MR. KERSHNER said the main purpose of the valuations was to calculate the assets and the liabilities to determine the funded status. He said they then compared those measurements with prior year's measurements and identified the key activity during the year.

MR. KERSHNER said the valuations would be used to set the contributions for FY23. He said as per the discussions of the prior day, the reason the 2020 valuations were used to set FY23 contribution rates was because the process takes time and it gives as much lead time to the employers and the state for budgeting purposes. He said they use what is called a two-year lag.

MR. KERSHNER said that Slide 6 showed the valuation results. He said with market performance and the effect of COVID on invested assets for pension plans as well as other assets, the last 12 months had not been favorable, but did perform better than other plans in the country. He said the market value of assets for the DB plans was above 4 percent.

MR. KERSHNER said they do not use potentially volatile market values to determine contributions because if market assets drop significantly, it would cause a significant increase in contributions. He said if assets performed better than expected, that would cause contributions to decline. He said to remove the potential volatility on the contributions, they use a term called "actuarial value of assets," which is the market value with five-year smoothing of the market gains and losses over time. He said each year's market gain or loss is then recognized in the smoothed value of assets, 20 percent per year, so at the end of the five-year period, all of those market gains and losses are recognized.

MR. KERSHNER said that when they determined the actuarial value at 6/30/20, they took into account market gains and losses that occurred in FY16 through FY20. He said the whole point of the actuarial or smoothed asset value was to dampen the effects of the market ups and downs.

MR. KERSHNER said that for the liability side, except for the retiree medical for the two DCR plans, all of the liabilities at 6/30/20 were less than what they expected them to be based on last year's valuation.

MR. KERSHNER said that for the pension side, the most significant gain on the liability was due to the fact that CPI or inflation did not increase as much as they expected it to be based on the long-term assumption, and the COLA, and the PRPA benefits that are provided to retirees in the two DB plans, those adjustments which are tied to the CPI increase, did not increase as much as they thought they would because inflation did not increase as much as they thought.

MR. KERSHNER said that healthcare funds are not tied to CPI increases directly, and the main source of the gains was the fact that they had a favorable year on the medical and prescription drug experience due to the change in the prescription drug administrator, which occurred in the middle of last year's cycle.

MR. KERSHNER said that when they put unfavorable market asset experience together with favorable liability experience, the contribution rates at 6/30/20 were flat compared to a year ago.

MR. KERSHNER said the ultimate goal of the valuation was to determine the FY23 additional state contribution. He said the employer contribution rates for PERS and TRS are set by statute and are fixed. He said that every PERS employer contributes 22 percent of pay to the PERS trusts, and every TRS employer contributes 12.56 percent of pay to the TRS trusts. He said that the actuarially determined contribution rate for those valuations was higher than those fixed contribution rates, and the excess amount falls to the state via the additional state contribution. He said that anytime there is a favorable or unfavorable experience that causes those contribution rates to go up or down relative to those fixed employer rates, the additional state contributions can go up or down as well.

MR. KERSHNER said that they would be providing the calculation of those FY23 additional state contributions in the next few weeks and then will discuss those with the committee and then the Board in further detail at the March meeting. He said that they had provided two different estimates of what the FY23 contributions were likely to be. He said the first one was based on 2019's valuation and the combined PERS and TRS amounts were \$320 million. He said that in September they had set the FY22 contribution rates and updated those projected amounts based on the preliminary June 30, 2020 assets, and those new projections resulted in higher FY23 additional state contributions of a bit above \$350 million. He said based on the preliminary results, they believed that the FY23 additional state contribution derived from those results would be between \$320 million and \$350 million.

CHAIR JOHNSON asked if MR. KERSHNER was going to be careful in describing to the legislative committees when he presents the data that it is a draft and preliminary information not yet subject to the full vetting that is required by law; MR. KERSHNER said that Buck does not present the information to the committees, they present it to DRB who then presents it to the committees. He said it was his understanding that the results are clearly communicated as preliminary and have not been finalized with the Board at that point, and that it is provided strictly for information and budget purposes.

MR. YOUNG said Slide 7 showed the actual incurred claims for medical benefits that were paid from PERS and TRS trust over the last two fiscal years. He said that data is used to set the average expected cost for retirees in the plans because healthcare benefits are not defined by a formula like pension benefits are.

MR. YOUNG said they look at the actual experience of the retirees and use that as a basis for setting future expected costs and projecting those in the future. He said the methodology that has always been used is to look at the prior year experience, and for the last couple of valuations they have used the last two fiscal years. He said they take the claims that are incurred by retirees and

calculate what the average cost that the retirees are incurring each year. He said they have to calculate a cost for medical separately for those prior to Medicare those who are eligible for Medicare, and then the same for prescription drugs.

MR. YOUNG said that since they use the claims in calculating an average cost, they do not want to have the short-term volatility distort and reduce the average expected costs they expect in the future because the point of the valuation is to try to predict the long-term expected average costs of the plans.

MR. YOUNG said that due to COVID, healthcare services were severely impacted starting around the middle of March. He said people stopped going to facilities because they were concerned about becoming infected, so there was a significant decline in the actual amount of claims that were incurred during that time. He said since they use those claims in calculating an average cost, they did not want to have that short-term volatility distort and reduce the average expected costs they expect in the future. He said it had been assumed that the COVID impact was a short-term issue and that once it has passed, they expect healthcare costs will return to normal. He said they excluded the months that were impacted by COVID in their calculations.

MR. YOUNG said Slide 8 showed the prescription drug claims. He said there was a spike in March for both under 65 and over 65. He said they attribute that to once things started to get bad with the COVID pandemic in March, people were rushing to refill their prescriptions before things started to shut down. He said a lot of people switched from getting a 30-day supply from their pharmacy to getting a 90-day mail-order supply. He said that unlike medical, where they had to make an adjustment because there was a huge drop in the claims during that time, there was not that need on the prescription drug side.

MR. KERSHNER said that Slide 10-13 were charts pertaining to PERS, TRS and DCR plans. He said there are three measurements in the charts, the first one is called 6/30/19 actual, which were actual results from last year's valuation with no adjustment. He said the next measurement is called 6/30/20 expected, which was what would the results at 6/30/20 have been if the 2019 results had changed from last year to the current year as expected; He said for example, if assets had earned the 7.38 percent return what would they have been at 6/30/20, and if all of the other assumptions had been realized, what would the liabilities have been as 6/30/20. He said the 6/30/20 actual was what the actual assets and liabilities were at 6/30/20 and they compared the actual with the expected and those deviate. He said in any given year they will have deviations between actual and expected values and if the difference is favorable to the plan then that leads to what they call an actuarial gain and if it is unfavorable to the plan, it is an actuarial loss.

MR. KERSHNER said that in total they were at 24.08 percent of pay last year and at 6/30/20 they were at 24.10 percent.

2. KPMG - Audit Report

MS. STUART said they were very committed to serving the Retirement Management Board with the highest level of audit quality, and they build that into their staffing plan, audit plan, the technology they use during the audit, as well as their review process that happens both on the detailed audit work performed, as well as the overall financial statement review.

MS. STUART said they had completed their audits and had issued their audit opinions. She said that there were several items in their report that stated there were no matters to report. She said that this was to emphasize that their obligation was to report to the Board all items. She said one item was if there were any unusual transactions that occurred in the past in the plans. She said they would perform audit work and report that directly to the Board so the Board would stay informed as to what major financial activities had occurred. She said they would also report any uncorrected audit misstatements, which are audit misstatement where there was an error, or a number misstated in the financial statements that they did not think was significant enough to impact their opinion.

MS. STUART said that they did not identify any illegal activities, fraudulent financial reporting and did not have any difficulties during their audit. She said they have a good relationship with the staff of the retirement system, as well as the commissioners' staff, and they provide all information requested on a timely basis.

MS. STUART said during the audit of the National Guard Retirement System, they identified that the retirement system did not have adequate controls to ensure the accuracy of certain components of the National Guard data. She said once National Guard members leave the State of Alaska, they may still be accruing benefits from their service in other states, but the Alaska Guard has no way to track that information. She said they do not know whether the census data that is used to determine the actuarial valuations is accurate, so they report that as a material weakness in controls.

MS. STUART said to summarize their auditors' report, they issued unmodified or clean opinions for five of the retirement systems. She said that they issued a qualified opinion on the National Guard system based on the matter that she just described. She said they do not have the information related to the census, and Buck can only use the census data that is provided to them to come up with an actuarial estimate.

MS. STUART said that there were not any significant changes in accounting policies that were pending and no significant changes in the accounting policies that were applied to the financial statements. She said when they evaluated the application of the policies, they did not identify any matters that caused them concern about management bias, including in the accounting estimates. She said the largest accounting estimates related to the total pension liabilities and the total OPEB liabilities.

MS. STUART said the financial statement amounts were built on several assumptions that were uncertain, such as the rates of return, mortality rates, retirement, and termination rates. She said they had reviewed those assumptions and the actuarial reports that were provided by Buck. She said they have a KPMG actuary review the assumptions for consistency with information that he saw across other retirement systems, and what he expected as an actuary independent of the retirement system actuary, and independent of Buck. She said that their conclusion was the assumptions used were reasonable and did not indicate bias, and the disclosures were appropriate.

MS. STUART said there was other information that was associated with the audits of the plans. She said they have issued all of the financial statements related to the plans, to the systems. They review the CAFRs when those are available, and they were expecting those soon. She said they would also perform audit work and issue an audit opinion on schedules that allocate the pension and post-retirement obligations across the various employers in the state. She said that audit would be issued before the end of the year.

MR. HIPPLER asked if the qualified audit for one of the plans impacts the State of Alaska's CAFR having a clean audit itself; MS. STUART said it did not. She said the size of the plan was not so significant that it impacted the State CAFR.

MR. HIPPLER asked what was the actual head count of physical people involved with the National Guard plan that they were unable track; MS. STUART said it was roughly 5,000.

D. Operations Committee

CHAIR JOHNSON said that the Operations Committee had a brief but informative meeting. He said they heard the Manager Review report from MR. HANNA. He said there were three items presented in the Treasury operations update by MS. LEARY and an action item.

CHAIR JOHNSON said the external communications process which was how they deal with the submissions in writing by their beneficiaries and other members of the interested public. He said that MS. JONES had created a log of the communications that should be reviewed by all.

CHAIR JOHNSON said that he thought it was an important way to add a reasonable record of the communications shared with them. He said they represent the beneficiaries and want to hear their proposals or suggestions, as they inform the Board's judgments.

CHAIR JOHNSON said the second item was a report from MS. LEARY in response to requests from MR. BRETZ regarding travel and honoraria. He said a document was provided that listed the information which they would discuss at the September meeting each year.

CHAIR JOHNSON said the other matter was an action item regarding the custody contract with State Street. He said MS. LEARY proposed to go forward with negotiations with State Street for an up-to-five-year contract. He said that that he thought it appropriate for the Board to go forward with the contract.

ACTION: Custody Contract

CHAIR JOHNSON said the action item is a recommendation that the ARM Board approve use of its delegation to MS. LEARY to negotiate an extension of the custody contract with State Street for a period not to exceed five years. He said that as Chair of Operations Committee he submitted the motion to the Board and that a second was not required.

MS. LEARY stated that the action memo included the reasons and authority as to why this could happen and that the current contract with State Street was extended also for a five-year period and that contract ends June 30th, 2021.

A roll call vote was taken, and the motion for the Operations Committee passed unanimously.

CHAIR JOHNSON said they had also heard a Middle Office update from MR. JONES regarding cybersecurity. He said they heard from MR. GOERING who talked about questions previously posed about the necessity of obtaining fiduciary insurance, but the answer to that was not practicable and not necessary. He said the state is self-insured and the types of insurance that would be the best used were not available. He said there is no need to go forward with that matter.

E. Alaska Retiree Health Plan Advisory Board

MR. BRETZ said that COVID was on a lot of retirees' minds and that one of the clarifying points of the meeting was changes in the AlaskaCare Retiree Defined Benefit Insurance. He said they had been working on a booklet with a new section added that clarified COVID. He said that testing and vaccinations were being added and the medical plan would cover medically necessary FDA-approved COVID-19 testing and vaccinations at 100 percent, subject to recognized charges.

MR. BRETZ said the exact language was in the report and that there were also changes to the IRMAA charges that retirees are assessed. He said the reimbursement process will be made easier in the coming year, which will be through OptumRx.

MR. BRETZ said that the Division had been looking into the possibility of having carriers bring a Medicare Advantage plan in and an RFP had been put out with some positive feedback from carriers that are interested in developing a Medicare Advantage program in Alaska.

3. LEGAL REPORT

MR. GOERING said that he had recently reported on three matters that he had updates for and stated that the ARM Board was not a party to any the matters.

MR. GOERING said that two of the cases were pending in the Alaska Supreme Court. He said one of them involved the potential for former employees to return to employment and buy back in. He said the case had been briefed and argued in the Alaska Supreme Court and was ripe for decision, but one had not yet been issued.

MR. GOERING said that the second case in the Alaska Supreme Court was pending briefing and involved a retiree's dental benefits. He said the State of Alaska believes that it had complied with the Superior Court's order but there had been outstanding questions about compliance with the Superior Court's order as well as what will happen going forward in terms of what dental plans would be offered.

MR. GOERING said that the third was a case in the Superior Court involving the change in a third-party administrator for retiree health plans, and that case was expected to go to trial in July of 2021.

CHAIR JOHNSON asked about the last case mentioned that challenged the new third-party administrator. He asked in what terms of the appointment of the third-party administrator; MR. GOERING said that the substance of the claim was that the change in third-party administrator resulted in changes to the way the claims were processed, and the types of services offered. He

said the substance of the case was what constitutes a benefit, and what constitutes simple plan administration. He said the plaintiffs were claiming that the change in the third-party administrator resulted in a change in benefits that were constitutionally protected.

CHAIR JOHNSON asked for clarification regarding the dental/vision/audio claims before the Supreme Court, that the issues were really about the specifics of whether there was a diminishment in the DB plan. He asked if an issue in the case was whether or not the D/V/A coverage was even subject to the diminution clause. MR. GOERING said one of the remaining questions in the case was whether or not the state will have to continue to offer plans as they were offered in the past, or whether, at some point, there can be a change to a new plan.

MR. GOERING said if the Supreme Court decides that it was not a diminishment in the first place, the answer would be they can move forward as necessary. He said if the answer was, yes, there was a diminishment, then the question would be: What happens in the future to plans that may or may not exist or may have changed in terms of what the commercial carriers offer; He said he thinks there is a lot of cleanup that needs to be done in terms of clarifying what the Superior Court decided and how it will apply going forward.

CHAIR JOHNSON recessed the meeting for lunch from 11:52 a.m. until 1:01 p.m.

3. Risk and Return in the Current Market Environment

MR. HANNA said that at the last Board meeting he promised to provide an early preview of the upcoming asset allocation process. He said that Slide 2 was related to asset allocation and touched on governance and management structure. He said that it was a more active process this year since the capital markets were so dynamic.

MR. HANNA said the investment return was compensation for bearing the risk, and that most incremental return involved a series of difficult tradeoffs. He said the asset allocation job was to select the balance of risks that best fit the return goals, time horizon, and liquidity constraints.

MR. HANNA said that pension funds can adopt a high-risk tolerance as they have a long-time horizon. He said that as a result the main investment advantage a pension has would be its ability to take long-cycle risks that other investors cannot take. He said those sorts of risks can be a challenge since performance was monitored over a shorter period of time and it was important to be thoughtful in assessing those risks in making decisions.

MR. HANNA said other principles relate to cost, efficiency, and complexity and that controlling all of these principles was fundamental to managing institutional capital and the ARM Board had been a leader in this regard.

MR. HANNA said Slide 5 showed the asset allocation starting point. He said the portfolio was heavily weighted towards public and private equities at 59 percent. He said they have 22 percent in fixed income and another 19 percent in real assets and opportunistic. He said the ARM Board and staff had recently completed a major portfolio restructuring focused on reducing complexity and investment management fees. He said it had resulted in a \$30 million reduction in fees every

year. He said the equity portfolio now has significant passive management exposure to risk factors and more limited active management. He said the portfolio was expected to meet the actuarial return target over a 20-year time frame.

MR. HANNA said Slide 6 provided a look at where the markets stand as they get closer to a year into the pandemic. He said Governments worldwide reacted quickly to the pandemic with a combination of monetary and fiscal stimulus to help stabilize capital markets. He said that as a result, interest rates in the U.S. had dropped by over 100 basis points through the 10-year point on the yield curve which, in turn, there is now increasing government debt, the prospect of continuing stimulus, and the Fed's willingness to accept more inflation. He said that all results in lower expected returns for bonds, a higher potential for longer-term inflation, and potentially dampened economic growth.

MR. HANNA said recovery for the equity markets had been rapid but fairly narrow. He said the winners were the companies that benefited from the transition to remote and e-commerce.

MR. HANNA said Slide 8 showed that interest rates had been steadily declining for 40 years and from an asset allocation perspective, it had been a tailwind for institutional investors. He said most hedges have a cost associated with them and fixed income had provided a strong equity edge, solid returns, and liquidity. He said that fixed income's ability to play a strong role moving forward had come into question.

MR. HANNA said that equities have been increasing in value for the past 40 years. He said one rationale for the increased valuations was related to the interest rate; since the discount rate applied to forward equity case flows had been steadily decreasing, equities and their earnings were more valuable from a discounted cash flow perspective, which was another explanatory factor behind the equity rebound during the year.

MR. HANNA said that Callan will release their 2021 capital market assumptions in January. He said the ARM Board uses a 20-year set of assumptions which is close to the weighted average life of their liabilities. He said other market participants had recently released their CMA's which provided a preview of what they could expect. He said fixed income returns were expected to be 100 basis points less than last year. He said equities were tougher to forecast and there was less consensus. He said that J.P. Morgan and others were forecasting a similar reduction due to the high valuations, slower future growth, and a lower risk-free rate.

MR. HANNA said that one common element that most are projecting is that the curve is still relatively steep as they move from bonds to stocks, so the equity risk premium is expected to remain largely intact. He said that overall, they were expecting a material 40 to 80 basis point reduction in expected returns of the ARM Board's current risk level over a 20-year time.

MR. HANNA said they were expecting a reduction in forward earnings and that he thought it would be useful to discuss the approaches used by their peers to adjust risk and return that could be considered by the ARM Board. He said for modest changes in capital market assumptions they have often kept the same core set of assets and moved up or down the efficient frontier targeting their actuarially assumed rate of return. He said the main thing to consider was the

increased volatility and downside risk. He said that since the ARM Board was more mature and had material cash outflows, its ability to recover from significant downturns was more limited than a fund that was less mature, but that the ARM Board has a long-time horizon and could afford to take a high risk within reason. He also said that the further out the efficient frontier is, the portfolio becomes very concentrated in equities and less resilient to states of the world where equities are not expected to perform well.

MR. HANNA said that another variation on the efficient frontier would be to add new or additional diversifying assets. He said some of them are return and risk enhancements that might be underrepresented in the ARM Board's portfolio and some are inflation hedges that would help in certain environments that the portfolio could face.

MR. HANNA said the ARM Board was taking equity factor risks with excess return compensation expected. He said they could consider increasing their active management in less efficient areas such as emerging market, small cap, and the REITs.

MR. HANNA said that adding leverage would be another way to increase expected returns and was also one of the more controversial approaches. He said they had also invested in leveraged strategies like private equity, direct lending, and others which could be increased. He said that at the portfolio level they could add leverage to improve diversification and also to increase return. He said it was usually done by investing using futures or other derivatives that were highly cash-efficient and repurposing some of the cash into new investments. He said that the last thing that could be done after working through all the other options would be to adjust return expectations.

MR. HANNA said that Callan would release their 2021 capital market assumption in late January and would formally take the Board through the CMAs and a deeper look at liquidity and the downside at the March meeting.

MR. WILLIAMS said that he was not one to jump into the pool for leverage, but it seemed that the cost of using leverage seemed to be fairly low and was a way to enhance returns. He asked if they have \$30 million in assets, do they leverage that to make it look like \$50 million, or what percentage would it be? He said that he thought that moving forward, leverage made sense in a conservative way.

MR. HANNA said that he thought MR. WILLIAMS initial response to be cautious was healthy and prudence was something to think about in relation to leverage. He said that if capital market assumptions remain low for an extended period of time, he does expect leverage to be a discussion that they will hear more often. He said CalPERS was considering a 15 to 20 percent additional leverage, so not to the degree of up to \$50 million, but more on the modest side.

MR. HANNA said that his approach going through this would be fairly neutral with all of the options. He said he does expect that the return deficit may be material enough that everything does need to be on the table.

MR. HANNA said that it does require consideration of several different points of view, such as the types of risks that they end up taking if they were going to look in to leveraging the portfolio.

MS. HARBO requested a comment from each of the IAC members on the best way forward and any cautions that they might have on what to do next.

DR. MITCHELL said that the next step would be to go over those alternatives one by one and ask what risk and what reward they present. He said that it was possible that the conclusion might be that they cannot do a whole lot given the environment that they may be in. He suggested they wait to see what MR. HANNA's study showed.

MS. RYERSON agreed with DR. MITCHELL.

DR. JENNINGS said he thought there might be a cheaper source of leverage through the financial markets. He said he appreciated that MR. WILLIAMS was open to the idea. He also said that he thought the answer to the degree of leverage was going to be a function of what you were doing with it.

MR. COLLINS said when they were looking at leverage -- and over the course of the last 10 years in the market they have seen moral hazards in adverse selection, a great identifier in the lending aspect, and with the current interest rates that they were seeing and had seen for five to seven years, would that lead into a greater opportunity in small cap and domestic equities, as well as utilizing the high yield corporate bond structure to where they have a greater rate of return with minimal risk due to the convertibility? He also asked as they hedge into potential inflationary risk with devaluation of bond holdings, if implementing a floating rate bond holdings to assist in capturing the increased interest rates over their 20-year liability were some of the proposed investment strategies that they would be vetting through the analysis in the coming months; MR. HANNA said some of those are things that he would expect to vet and some of them were already present in the existing portfolios.

COMMISSIONER MAHONEY thanked MR. HANNA for his presentation and said that it was timely and a good conversation for the Board to address. She said that they had been going through a similar exercise at the permanent fund in terms of trying to address the gap as well. She said one of the areas they decided to address was something that she wanted to present to the Board for consideration, which was to determine how much risk they were willing to take, what level of risk were they willing to be at and address it in a manner where everyone would understand.

CHAIR JOHNSON said that COMMISSIONER MAHONEY posed the question and to the extent that they can advise and come up with a sense of how much risk they were willing to take, he would be happy to try doing that.

MR. HANNA said that it was a process of triangulation to try to figure out the elements of risk that were most impactful to the ARM Board in areas where they could afford to increase their risk posture. He said it was his view that there were two governing aspects of risk. He said one was liquidity over time as the funds continue to mature, they need to be sure that they can pay benefits when they come due and that they can effectively afford the public equity posture and be able to rebalance into public equities when they go through downturn periods.

MR. HANNA said the downside risks have the same aspects to them in terms of do they have a mature plan that has material outflows, the path of returns does matter because every year of outflows is a portion of the portfolio that can no longer recover from a significant drawdown. He said more would be discussed during his presentation the following day.

MR. WILLIAMS said that that it looked as if they were a bit riskier than some of the portfolios because they were at 59 percent equities. He said if they needed all their money next year, that would be dangerous, but based on the length of their plan, he was comfortable with them being 59 percent in equities. He then asked if there were other aspects of their plan that makes them riskier than others and was MR. HANNA confident that if they go deeper into private equity, will they get diminishing returns because they are pursuing projects that are less quality; MR. HANNA said both public and private equities at 59 percent was largely what puts them at that place in the efficient frontier. He said that opportunistic and real assets also have a 60/40 risk of posture which contributes to a degree as well. He said as far as MR. WILLIAMS second question, he would defer it until the presentation the following day as to not steal Callan's thunder.

MR. WILLIAMS said he could wait for the answer.

MR. HANNA said that it was a good question to think about as they hear both presentations and to ask the presenters for their views on it.

4. Private Equity Annual Plan

MR. HOWARD presented an overview of the private equity asset class, market conditions, and the ARMB's portfolio and plan recommendation. He first directed the Board's attention to Slide 4 which showed a pie chart that reflected results from an investor survey that had been conducted that asked specific questions to fund sponsors. He said the results pointed to return enhancement being the primary consideration. He also directed the Board's attention to a table that showed a comparison between the Cambridge private equity composite and public equity benchmark blend made up of one third S&P 500, one third Russell 2000, and one third MSCI EAFE. He said it was a public equity blend that was established in ARMB's private equity guidelines and that it had done quite well.

COMMISSIONER MAHONEY asked if they were returns net of fees; MR. HOWARD confirmed that it was net of fees for private equity and for public equity they were index returns.

MR. HOWARD directed the Board's attention to Slide 5 which listed several characteristics of private equity that helped to explain why the opportunity of enhanced returns existed. He said that private investment opportunities were large with the vast majority of the companies being ran privately. He said the number of public companies had declined over time due in part to the growth of the private market which had developed to the point that companies could remain private and have access to capital without the distraction and expense that comes with being a public company. He said most private equity groups aim to buy higher-growth companies at low valuations, create value by making operational and financial improvements, and then sell the companies at higher valuations. He said the negative characteristics of this was that private equity is illiquid, fees are

high, and the market data was imperfect.

MR. HOWARD said that Slide 6 gave information on private equity structure. He said the ARMB was currently invested in private equity funds through two advisors, Abbott and Pathway, and that the investments were made through limited partnerships outlined in the top diagram. He said in the limited partnership structure, ARMB and other investors were limited partners, and the private equity group was the general partner and directed investments in underlying companies. He said the bottom diagram showed how typical private equity funds drawdown structure worked and was an important component for controlling the Board's overall allocation to the asset class.

MR. HOWARD said that Slide 7 gave a broad overview of the types of strategies included in private equity. He said the investments in ARMB's portfolio were categorized in three separate groups and differentiated by a portfolio company's corporate growth stage. He said the first was venture capital, which invests in earlier-stage companies. He said the second category was buyout, which invests in mature operating companies and the third was special situations that is a catchall for groups that either had a multi-strategy or specialty focus.

MR. HOWARD said that on Slide 8 the top graph showed the spread between upper and lower quartile Cambridge performance by vintage year, and that was the year capital was initially deployed by a fund. He said upper quartile funds had significantly outperformed lower quartile funds and that dispersion made manager selection a critical component of portfolio implementation. He said avoiding the bottom quartile was important to the success of the program and that the ARMB's portfolio was invested through institutional-quality managers with well-established business and proven capabilities. He said that diversification was achieved on several different fronts, including strategy, industry, geography, vintage year, and manager. He said the goal was to build a well-diversified portfolio of high-quality partnerships.

MR. HOWARD said Slide 9 shows that 2019 was another year of fundraising growth. He said that he expected this to continue as investors sought out asset classes that could help them meet their return targets. He said GPS had quickly adjusted to fundraising without the ability to travel and fundraising had been relatively strong. He said because of the demand for private equity, terms were GP-friendly and access to top managers could be challenging.

MR. HOWARD said that Slide 10 showed that investment activity had declined slightly in 2019 due to a 30 percent drop in large buyout deals and that deal activity had then been negatively impacted during the first half of 2020 as economic uncertainty created a divergence between buyer and seller pricing expectations.

MR. HOWARD said Slide 11 was a chart that highlighted the common paths GPs take to exit investments and that the primary sources of liquidity were through the MNA market. He said the secondary sources of liquidity were through an IPO or recapitalizations which were dividends paid to private equity firms funded through issuance of additional portfolio company debt. He said he had added a bullet point on the recent growth in Special Purpose Acquisition Companies, which are companies that raise capital through an IPO and then use the capital to purchase and take companies public through a reverse merger.

MR. HOWARD said that overall, the portfolio had performed well, in the 40th percentile with an 11.8 percent IRR compared to 8.5 percent for the Cambridge private equity median. He said it was helpful to compare the performance against public equities through timely returns and public market equivalent IRRs.

MR. HOWARD said the ARMB's private equity policy had an expectation for the private equity portfolio to outperform the public equity blend over rolling 10-year periods by 200 basis points, and that was net of fees using both calculations methodologies. He said the ARMB's 10-year time weighted return was 15.4 percent, compared to 10.2 percent for the benchmark blend which was an outperformance of 522 basis points.

MR. HOWARD said the second way of measuring relative performance against public markets was by comparing against public market equivalent returns, (PMEs). He said PME's were the returns they would have achieved in the public market if they were to buy in and out of the policy benchmark using their actual private equity cash flows.

MR. HOWARD said that over a 10-year period, ARMB's portfolio had a 15.1 percent IRR, compared to the PME IRR of 11.6 percent, which was an outperformance of 343 basis points. He said since inception, the portfolio had outperformed the PME by 441 basis points which was equivalent to \$2.1 billion of additional fund value than if they had only been invested in the public markets.

CHAIR JOHNSON asked MR. HOWARD if he had seen a length of time between commitments and actual contributions and if that time had increased, and if so, how did it get accounted for and if there was a negative impact; MR. HOWARD said that those time periods had extended a bit. He said the level of private equity exposure would be based on the paid-in capital and uncalled capital of 1.6 billion would remain in cash or out of private equity. He said that they expect the capital to be called over several years.

COMMISSIONER MAHONEY asked why wouldn't we keep the money in public equities because public equities are very liquid. MR. HANNA said that was what they were doing - the money was not sitting in cash.

CHAIR JOHNSON asked if the \$1.6 billion had increased in size or had it gotten smaller; MR. HOWARD said that it had increased as private equities became a larger component of the portfolio.

MR. HOWARD said that Slide 14 showed that the ARMB's portfolio resulted in distributions of \$593 million, which was slightly more than the amount contributed and that over the past five years the portfolio had been a significant cash generator for the retirement system providing net cash inflows of \$235 million. He said that was a result of increasing private equity commitments several years ago that enabled it to reach a 12 percent portfolio allocation.

MR. HOWARD said that Slide 15 showed that the portfolio was well-diversified by strategy and that the targets were 25 percent to venture capital, 45 percent to buyout, and 30 percent to special situations. He said that the portfolio was close to these guidelines and staff expected diversification

to remain in line with long-term targets.

MR. HOWARD said that Slide 16 included pie charts that summarized data by looking through the over 2,000 companies in ARMB's private equity portfolio. He said the portfolio was well-diversified by both industry and region and that international investments represented 25 percent of the portfolio. He said that software represented 29 percent of the portfolio as it is inherently diversified since it is exposed to an end market rather than a narrow set of risk drivers.

MR. HOWARD said Slide 17 showed the commitment target for 2019 was \$590 million, and during the year \$508 million was committed to 48 investments with \$191 million by Abbott, \$222 million by Pathway and \$95 million directly. He said the co-investment program, which started in 2016, made 15 investments totaling \$47 million.

MR. HOWARD Slide 18 showed their pacing model which projected forward commitments needed to achieve ARMB's targeted allocation to private equity. He said that Slide 19 showed the output of the pacing model and their recommendation for forward commitments. He said that in summary, as expected returns decline for all major asset classes, private equity plays an important role in achieving ARMB's return target. He said that because private equity had been a reliable source of excess returns, the asset class had experienced tremendous growth which was expected to impact future returns. He said that they continue to look for opportunities to drive performance and cost improvements and adding co-investments was a good example of that.

MR. HIPPLER asked about the directly managed portion of private equity - that as the staff was privately managing that, how do they find opportunities; MR. HOWARD said the staff utilizes Abbot's, Callan's, and Pathway's deep industry knowledge for funds, and does their due diligence on those investments as well.

COMMISSIONER MAHONEY asked if the returns between Abbott, Pathway and their direct investments were comparable; MR. HOWARD said that the Abbot portfolio has a 10.5 percent since-inception IRR, Pathway has a 14.2 percent since-inception IRR, and the staff direct investments were a bit more of an immature portfolio at 10.4 percent since inception.

MS. RYERSON asked how they decide which portfolio gets how much and how they make sure they are not over-allocated to any particular fund; MR. HOWARD said that the approach allows for higher-conviction investments, but they have always been conscientious of what Abbott and Pathway do.

MR. WILLIAMS asked what the correlation between private equity and public equities was; MR. HOWARD said that they were driven by similar economic factors and from a diversification standpoint, private equity could be thought of as a way to diversify.

COMMISSIONER MAHONEY asked if they were approving the 29 percent allocation to the software industry or was that something that the Board could still discuss; MR. HOWARD said the 29 percent allocation to software was already in place and what the Board would be approving would be next year's pacing of \$600 million.

CHAIR JOHNSON asked with respect to Resolution 2020-18, was the proposed plan for adoption the entire presentation or just Slides 15 and 16; MR. HOWARD said they consider the whole presentation the plan.

MS. HARBO moved to adopt Resolution 2020-18. MR. HIPPLER seconded the motion.

A roll call vote was taken, and the motion to adopt Resolution 2020-18 was adopted unanimously.

5. Private Equity Review

MR. ROBERTSON said that the Board had enjoyed nine years of positive cash flow out of the portfolio. He said through Abbott, they had been investing in private equity for 22 years and they started investing at high prices and then investments got hurt and then ramped up again. He said that would be evident in their IRR return because it was not as good as their multiple. He said IRRs were sensitive to early cash flows. He said that hiring Pathway in 2001 was a brilliant move, they are a buyout-oriented manager and they were hired at the beginning of the buyout boom.

MR. ROBERTSON said the Treasury portfolio was started just before the GFC which was similar to what happened with Abbott. He said little money was invested at the beginning of the staff portfolio and most of it had been in more recent years so for having invested for 12 to 14 years, it is still a young portfolio. He said that year after year the private equity portfolio increased quite a bit, even though the total plan did not. He said that a positive would be the uncalled capital at 50 percent of the private equity target.

MR. ROBERTSON said that the current fiscal year had a boom during the first half, that in the last half of 2019, the equity markets were roaring, and the MNA markets were highly liquid. He said since March, the private equity market had stayed strong, and on a dollar basis through the third quarter, they were down 7 percent from 2019. He said from an investment and exit standpoint at the portfolio company level, they were down quite a bit from 2019 and that there was a 30 percent decrease in MNA activity through the September quarter. He said once the pandemic started, the general partners stopped investing and paid attention to their portfolio companies.

MR. ROBERTSON said after the first quarter was over, the second quarter prices had dropped, that in 2019 prices were at 11 to 12 percent on average in the buyout market, then they dropped by the second half to 9 times cash flow, so they started investing aggressively and by the end of the third quarter, prices had rebounded significantly.

MR. ROBERTSON said the paid-in, or money getting invested into companies went up to \$600 million, and the paid-in comes from the start at uncalled of \$1.68 billion which was 36 percent of their starting uncalled. He said for distributions, \$515 million gross out of the portfolio last year came out of the starting NAV, which was \$2.967 billion, a 17 percent distribution of that NAV. He said that part of it was principal, part of it was gain, but it was a strong cash flow out of the portfolio. He said that they do not just take cash out of the portfolio, that they have to put cash in; putting the two together, they had to put in \$87 million or about 3 percent of the original NAV into the portfolio last year.

MR. ROBERTSON said that the NAV increased \$391 million, or a 13 percent year-over-year rise.

He said considering the paid-in, which was negative 3 percent plus the 13 percent unrealized appreciation it would equal a 10 percent increase in the portfolio.

MR. ROBERTSON said the IRR through June was 11.8 percent, the median Cambridge benchmark was 8.5 percent with an upper quartile of 16.6 percent which puts it in the 40th percentile. He said the total value to pay in was 1.56 percent, which was above the 1.34 percent median and puts it in the 39th percentile.

MR. ROBERTSON said that the portfolio commitments had increased 3.5 times over the past 14 years and that the TVPI has had a gradual steady increase over that time frame and that he expects to see that to continue to rise before leveling out as that portfolio continues to build.

MR. ROBERTSON said they have a lot of venture capital, which was a good thing and that high-quality venture was hard to access and was a benefit for the portfolio. He said that as MR. HOWARD had touched on, they have a lot of tech, which in the current environment was a fortuitous industry classification to be in. He said the overall geography was similar to peer portfolios and close to their intended amount of international at 26 percent and having 20 percent in Europe and a bit more in Asia and elsewhere was normal.

MR. ROBERTSON said that Abbott was their longest-standing manager with 38 percent of the portfolio. He said the firm had been very stable, but they were beginning to see retirements. They had three in the last two years. He said the CEO was still relatively young and will be there for a while. He said that Abbott has a rule that when they hit social security retirement age, they are out. He said the transitions from old staff to new staff have been smooth.

MR. ROBERTSON said Pathway was the larger of the two managers at 45 percent of the portfolio. He said the firm had been very stable with few retirements and one departure in the last two years. He said the three founders were still in place and he was not getting any sense that anyone was going anywhere in the near future.

MR. ROBERTSON said that the in-house portfolio had 28 investments that had been made in the portfolio over the last 14 years. He said the goal of the staff was to try to enhance the number of investments in each year to five or more gradually going into the future. He said they had been investing for 14 years, but in 2009 and 2011 due to the Global Financial Crisis, no investments were made. He also said that 44 percent of the commitments in the portfolio were older than 3.5 years, so most of the portfolio was hardly even paid in, so it was a much younger and dynamic portfolio. He said that corporate finance was the key focus, with less emphasis on venture or no venture capital in the portfolio. He said there was emphasis on secondary and debt-related distressed and mezzanine, which makes it a lower-risk, lower-return profile than the other two external managers.

MR. ROBERTSON said last fiscal year \$80 million was invested in two partnerships, compared to \$185 million the year before. He said the uncalled of \$155 million was 33 percent of the starting uncalled. He said they had a gross distribution of \$111 million or 21 percent which was better than the overall portfolio which was 17.4 percent for a strong cash flow out of the portfolio and that is up \$57 million from a year ago. He said they paid \$44 million in net distribution which was 8 percent funding mechanism, versus a 3 percent for the total portfolio. He said if they add it all up, it had a

slightly negative year-over-year return or uplift in the portfolio.

MR. ROBERTSON said that to sum up, they had overcome the early tech bubble and increases with good returns, that the portfolio was close to its target. He said the TVPI was in the 39th percentile and well above the peer median. He said that all three portfolios were doing quite well even when considering the unusual circumstances of the past year. He said that private equity was a good place to be during all the volatility; that two notable factors were they had a strong paid-in rate and a strong unrealized appreciation during the year. He said that performance moderated but remained strong on a year-over-year basis and looking forward it seemed that the markets were stabilizing with vaccines coming out. He said it will take a while and he expects the markets to continue to be volatile, but overall, private equity had been a good place to be.

MR. HIPPLER said the way MR. ROBERTSON was using “percentile,” the 99th percentile would mean they were only better than the 1 percent of other people and the 1st percentile would mean they were better than 99 percent of people and asked if that was his intension; MR. ROBERTSON said that was correct.

MR. WILLIAMS said there was a portion of the presentation where he was not sure of the numbers and that he wanted to confirm that the numbers were correct; MR. HANNA said MR. ROBERTSON would get back to the Board with a correction or confirmation. MR. HANNA said MR. HOWARD mentioned that they did decrease their premium over the benchmark from 350 basis points to 200 basis points last year and they recommended doing so because the asset class was more efficient than it was.

MR. HANNA said he thought Callan had a roughly 130 basis point premium in their capital market assumptions for the asset class, so the ARM Board’s 200 basis point premium was an excess of that number.

MR. HANNA said that one thing they had not touched on was that the nature of private markets and public markets have changed dramatically of the past 15 years. He said Sarbanes-Oxley and additional regulations made it comparatively less attractive for companies to become public. He continued by saying that due to the growth in the private markets companies now have access to capital and those things go hand-in-hand. He said the smaller higher-growth companies are much less accessible in the public markets than they were in the past and the only way they can access that performance is through the private markets.

CHAIR JOHNSON recessed the meeting from 3:01 p.m. until 3:11 p.m.

6. ISO 27000 Review

A. Introduction

MR. JONES said that he was going to discuss the ISO 27001 and 27002 assessment that had been completed for the Treasury Division. He said the presentation would include sensitive information and because of that, the presentation will take place in the Executive Session.

B. Executive Session

CHAIR JOHNSON asked for a motion to go into Executive Session for the purpose of considering

matters, the immediate knowledge of which would lead to the detriment of the ARM Board and its operations, and specifically regarding security issues surrounding the ARM Board and the Department of Revenue.

MR. HIPPLER moved to enter into Executive Session. COMMISSIONER MAHONEY seconded the motion.

CHAIR JOHNSON requested that participation be limited to Trustees of the ARMB Board, MR. HANNA, MR. JONES, MS. JONES, MS. LEARY, and Assistant Attorney General GOERING participating.

MS. LEARY requested that MS. ROMBERG and MR. FICEK, support staff to MR. JONES be allowed to join as well.

Hearing no objection to the cast of attendees, a roll call vote was taken, and the motion to enter into Executive Session was approved unanimously.

CHAIR JOHNSON recessed the meeting at 3:20 p.m.

Friday, December 4, 2020

CALL BACK TO ORDER

CHAIR JOHNSON reconvened the meeting at 9:00 a.m. All Board members were present.

CHAIR JOHNSON announced that the ARM Board came out of Executive Session yesterday at 4:28 p.m. No actions or decisions were taken by the Board after hearing confidential information pertaining to security and matters, the knowledge of which would have been to the detriment of the ARM Board. He further stated that they were out of Executive Session and back in regular session.

7. Approaches to the Current Macroeconomic Environment

MR. HANNA introduced JOEL WHIDDEN and PATRICK DIMICK from Bridgewater to discuss navigating the current macroeconomic environment.

MR. DIMICK said that he was going to cover the notion of the new policy paradigm and what they mean when they say that. He said they call it Monetary Policy 3, or MP3 which is the new way that economic cycles were going to be managed. He said the two important topics for portfolios were inflation and bonds. He said inflation was not something that many of them have had to worry about and that higher rates of inflation may not happen, but it was time to consider the possibility as more than a far-out scenario.

MR. DIMICK said that the policymaking paradigm that they are in was defined by the channel through which policymakers try to effect economic recovery. He said that Monetary Policy 1, (MP1) was the way that economies have been managed has always been when the economy was too weak and they needed to stimulate more activity, the channel through which they would do that was to stimulate borrowing and cut interest rates. He said by lowering interest rates, certain people

would borrow money more so than before, and they would spend that money which is how the economy is managed. He said when it was time to cool things down and fight inflation, they raise interest rates which chokes off borrowing and slows things down. He said the way to manipulate the economy was to manipulate borrowing behavior.

MR. DIMICK said that ended in 2008 during the Global Financial Crisis; once the short rates got down towards zero those rates could not be manipulated. He said in 2008 they started quantitative easing or, Monetary Policy 2, (MP2). He said trillions of dollars were printed by the central bank and they used that money to purchase assets. He said MP2 tries to manipulate the economy through manipulating the behavior of savers, not borrowers. He said by purchasing trillions of dollars' worth of assets and pushing up asset prices or removing financial assets from the system, savers would create new assets or go buy other assets to replace those assets.

MR. DIMICK said that they had known for some time that they would need MP3, which targets neither borrowers nor savers, but the spenders. He said that they thought it would play out over a few years across different countries and at different times. He said that what they did not know coming into 2020 was that there was the most sudden economic collapse in economic history. He said the first quarter of the year was a much faster plunge in incomes than occurred in the Great Depression, and it was a global event, which meant that every country was suddenly forced to adopt a form of MP3. He said budget deficits of this size had not been seen since Pearl Harbor. He said if governments were going to spend that much, the only way to get that amount of money was by the central bank printing the money to fund the government spending.

MR. DIMICK said that all developed world countries are in MP3 and his view was that they will all be in it for quite a long time because the other levers available for economic stimulation were not present, and more stimulation would be needed for quite some time.

MR. DIMICK said that the GDP in the first part of the year was down nearly 18 percent and was about at 9 percent currently. He said the drop in mobility, that people are not able to get out and spend was going to be a challenge for a while, even with a vaccine. He said under the current forecast for how much nominal income growth there is going to be in economies, it would be 1 to 1.5 percent real growth rate in developed world economies, and stack that on top of the inflation that will happen there could be a 2.5 percent growth rate in nominal income per year.

COMMISSIONER MAHONEY asked if MR. DIMICK would correlate this to the record Dow Jones Industrial of \$30,000 and how it fits in his graphs: MR. DIMICK said the easiest way would be to appreciate how much it helped the stock market prices when MP1 runs its limits, which means short-term interest rates were made as low as they possibly could go, then the central banks printed tens of trillions of dollars to purchase assets since 2008 and those asset purchases flowed all the way out the risk curve into equities, including the Dow Jones Average. He said the combination created a backward-looking return. He said there was only one lever left for policy makers – reflate. He said the 1 or 1.5 percent real growth would generate enough income growth if the inflation rate was much higher than what has been experienced at any time in the last 20 years.

MR. HANNA asked if MR. DIMICK would make a few comments in terms of the relative timing of this in terms of just how long this may take to play out; MR. DIMICK said they think it is worth

trying to open investors' minds to the possibility of inflation happening soon, as in the next year or two. He said that he thought it was difficult to predict when they will start to see the inflation, but he thinks it will show up soon. He said he imagines inflation rates coming in much higher than the markets are expecting.

MR. DIMICK said that now that it is an MP3 world where it is an unfamiliar policy of the central bank printing money and the government spending it or handing it to people who will spend, there are a couple possibilities. He said one would be to work their way through the next several years, they do not do enough policy response, that at some point policymakers would say, "Enough is enough. Look at the amount of money we've printed. Look at the amount of government borrowing. 20 percent of GDP budget deficits. It is flat-out irresponsible. We've to tighten our belts a little bit." He said if that were to occur, there would be a period of time where there would be inadequate stimulation and then there would be a Japan style of deleveraging. He said that if the policy makers continue to push the print-and-spend approach to its limits, reflation would happen.

MR. DIMICK said that in the 1970's the U.K. was a great example of a period where a lot of reflation was needed, but was accrued mostly to labor, and corporations did poorly. He said inflation rates went up, nominal GDP went up but that was not good for the stock market because it was a strong period for labor power.

MR. DIMICK said that there could be reflation that would be very pro-labor and not good for equities and there could be reflation that would contain good growth and profits for capitalists, and it works for the stock market. He said in a policy environment like the current one, all the outcomes are on the table and when they look back at the history of period that resembles the current period, meaning lots of stimulation and reflation is needed, what happens to the asset returns; He said Slide 12 showed those periods of history where lots of reflationary stimulus was needed. He said to ignore the deflationary depression scenario because he thinks the scenario where no stimulation was possible because they are on a gold standard. He said no one is on a gold standard and they hopefully do not have to worry about the deflationary depression.

MR. DIMICK said that there is a group of experiences which they call insufficient stimulation, where there is printing and spending but not quite enough. He said that is an environment for multiyear periods that is poor for equity market returns. He said historically it had been good for nominal bond returns but would not be now because bond yields cannot fall. He said inflation - indexed bonds and gold tends to do better when there is a strong effort to stimulate, but it is a tough time for portfolios.

MR. DIMICK said that there are two ways that reflation can go if they continue with the print-and-spend MP3. He said there could be what they call successful reflations, where some of the print-and-spend goes to productive ends and achieve economic activity to accompany the higher rates of inflation. He said there are excellent historical results if the reflation is successful. He said inflation hedging assets also do well, equities can do well and portfolios that combine those things together do quite well. He said there is a scenario where a lot of money is being produced and creates an unstable inflation, or confidence-damaging levels of inflation. He said what people mostly do with the printed money is not engage in productive economic activity, but try to push that money into inflation hedges, then worry about the value of money.

MR. ERLENDSON asked if MR. DIMICK sees that MP3 is going to be the province of central bankers, legislators, or the executive branch that are going to push it forward to make it happen: MR. DIMICK said he thinks the spending or distribution of the money for others to spend will be the role of the legislators, and the role of the central bank, while essential, would be radically degraded relative to economic history. He said the central bank has to be there to keep rates, but the government has to distribute the cash; it's fiscal monetary coordination and both are needed. He said it will be interesting times and will produce huge differences across countries in terms of how different countries manage a different policy mix.

MR. DIMICK suggested that they look at their risk through three lenses. He said the first lens diversifying across asset classes for more inflation protection, the second lens is mitigating risk through geographic diversification, and third lens is active management.

MR. WILLIAMS asked if MR. DIMICK thought there was a higher probability of all countries going the same way, or did he think there would be diversity and how confident was he that this approach would rule the day in the foreseeable future; MR. DIMICK said that there would likely be wildly different outcomes across countries based upon how many different ways money can be distributed, and difficulty reaching agreement. He said the MP3 policies would probably be with them for a very long time, and hence risk management and diversification were a valuable investment of time.

8. Performance Measurement - 3rd Quarter

MR. ERLENDSON briefly touched on who Callan was for the new Board members. He said that there are four functions that Callan assists with: asset allocation, manager selection, performance evaluation, and education.

MR. ERLENDSON said there was a significant drop-down in economic activity in the second quarter as the COVID epidemic hit. He said in February there were over 152 million Americans employed and at the beginning of April, that number fell by 25 million. He said economic stimulus programs took place and started to take effect by the end of the second quarter, which was where the uptick happened in the GDP.

MR. ERLENDSON said they could encapsulate the challenges of fixed income because Treasury bonds are viewed as the safest thing to do with money and is the baseline off of which any other asset return is priced on a risk level. He said that investing in equities or corporate bonds would be more risk but lends to a higher return than Treasury bonds. He said a 30-year Treasury bond was yielding 2.12 percent and then at the end of September it had dropped to 1.4 percent.

MR. ERLENDSON said that the industries that have the best performance were typically in online retail and technology, which were two major sectors that benefited from the work-from-home perspective. He said the industries that suffered the most were ones that had the greatest employment population.

MR. ERLENDSON said that when they take the GDP apart, 30 percent of it is due to spending and consumption patterns within government, agriculture, and other service industries, but looking at

technology, their contribution to GDP is 6 percent.

MR. ERLENDSON said that in the U.S., 1 percent of the population works in technology and when looking at the composition of the S&P 500 in terms of the weighting of stocks within that index, the largest sector is technology at 39 percent. He said in 1990, technology was composed of about 6 percent of the S&P 500. He said that consumer discretionary, consumer staples, industrials, energy, utilities have shrunk over the last 30 years as a proportion of the stock market composition. He said that energy now constitutes 2 percent of the stocks within the S&P 500 and in 1990 it was at 11 percent, meaning the stock market is not the economy.

MR. ERLENDSON said that there had been constant job growth over the last five months, but there are about 10 million fewer jobs today than there were at the beginning of February. He said that feeds into a ratio called the participation rate which counts people who either have a job or are looking for a job. He said currently, the participation rate has fallen to 63 percent from 70 percent and has been falling steadily. He said what that means is the 10 million people that lost their jobs have not regained them, but of those people fewer of them are looking for work. He said that was not a great reflection given that the consumer constitutes two-thirds of the GDP.

MR. ERLENDSON said that in the beginning of this century, short-term interest rates were at 6.5 percent. He said that since the Global Financial Crisis that began in late 2008, it has hovered pretty close to zero until about 5 years ago and then due to the COVID crisis, they have collapsed again. He said that the Fed is planning on leaving short-term interest rates at zero for the foreseeable future but are looking for something above 2 percent which he thinks feeds into the MP3 theory.

MR. ERLENDSON said that the last 25 years the average cash return had been 2.3 percent but over the last decade it has been close to zero, so getting short-term interest rates up to 2.5 percent will be a heavy move.

MR. ERLENDSON said that the long-term savings rate peaked at 15 percent but has been steadily coming down until the stimulus programs went into effect. He said people did not go out and spend that money, they saved it.

MR. ERLENDSON said that for the March meeting in 2021 they will be working with staff to make a presentation on capital market projections through pension funds. He said they were looking at a list of asset class benchmarks which they have grouped as U.S. Equity, non-U.S. equities, fixed income, and real estate. He said the Russell 3000 has had significantly positive returns and that area of the market has been most popular among investors in the U.S. large cap stocks.

MR. ERLENDSON said that with Treasury bills there has been a 2.3 percent for the 25-year return on cash and that includes the 10-year, the 5-year, and the 1-year where the return on cash has been at or below 1 percent.

MR. ERLENDSON said that the inflation rate has been at 2 percent for the last 25 years. He said that the driver for economic activity would be getting money into the hands of people that will then be competing for goods and employers that will be competing for employee.

MR. ERLENDSON said that the Russell 3000 is a proxy for large, mid, small, value, core, and growth stocks, and through the end of the third quarter it was up 9.2 percent. He said that the Russell 1000 versus the Russell 2000, the small cap index was only up 5 percent. He said that this phenomenon had been going on for seven years, where small cap stocks have had a difficult time delivering the expected returns. He said that the first two months of the fourth quarter - October and November- there was a reversal. He said small cap stocks were up 22 percent, and large cap stocks measured by the Russell 1000, were only up 10. He said the same thing was true for growth value - growth stocks were up 13 percent versus 5 percent for value. He said for the first two months of the fourth quarter, that was reversed. He said even though there are elements that have not been performing up to stuff, Callan still believes they merit inclusion within the Board's portfolio.

MR. CENTER said that Slide 18 showed the performance dashboard for PERS, TRS, and the judicial system, which showed the historical returns for the last one, three, five, and 10 years. He said last year plans underperformed the policy target, but over the three years and longer, all of the plans had outperformed their policy targets over those times. He said that all three plans have exhibited a lower standard deviation - a lower-risk profile than the benchmark over the last three, five and 10 years and all three plans had done better than the benchmark over the maximum drawdown measures over that same time period. He said the Sharpe Ratio -- a return per unit of risk, how well the risk was being implemented within the plan, were strong relative to the policy target and peers over all trailing periods for all three plans.

MR. CENTER said that Slide 19 showed the three healthcare plans all had similar profiles. He said last year's performance was difficult relative to the target, but longer-term performance compares favorably. He said they had a lower standard deviation over time and strong comparable drawdown statistics and a relatively high Sharpe Ratio relative to both the benchmark and the peers.

MR. CENTER said the military plan has historically had a different asset allocation. He said it had been at a different, more risk-averse risk profile than the other plans and is compared against its own benchmark but does have a similar return pattern to its policy target.

MR. CENTER said Slide 21 showed the PERS Asset Allocations as of September 30th were in line with target allocations, slightly overweight to domestic and non-U.S. equity, and slightly underweight to fixed income, real assets, and private equity.

MR. CENTER said that in conjunction with MR. JONES and the Department of Revenue, they have instituted a one-quarter lag in the performance for the private equity and for the real assets portfolio. He said it was common in the institutional investment space to accept that it was rare to get up-to-date information on the Board's private investments in time to discuss their performances at the quarterly performance meetings - the report on those assets will be one quarter in arrears. He said in order to do that, the performance for the private equity portfolio and the real assets portfolio during the third quarter was zero. He said they had done the same for their benchmarks and they were also lagged with a zero return. He said that meant that 25 percent of the PERS, TRS and judicial system's performance for quarter 3 had a zero return.

CHAIR JOHNSON said that as he understood, there was \$1.6 billion worth of commitments and

those commitments would be left and invested in public equity. He asked if having much uncalled-for commitments in the private equity silo, affected the allocations; MR. CENTER said no, it was common, in order to keep the private equity program in place and invested over time, to commit a higher portion than what the actual target was. He said in this case, the target allocation to private equity was 12 percent, for PERS they were close to that allocation, but with the investments in private equity, they will get their capital return over time and will need to keep a commitment to private equity so that as they receive money back, additional money gets invested. He said they have an overcommitment to private equity because additional capital gets returned from the existing program over time, and capital gets recycled into private equity. He said the committed capital that is sitting on the sidelines, typically sits in the public equity portfolio in order to keep the exposure to company investments.

MR. ERLENDSON said if there was a capital call, staff would typically fund the capital call from the asset class that was above target. He said normally that would be equities, but if they have to have a market correction and suddenly domestic equities were 2 percent below target and fixed income was 2 percent above target, and they get a capital call for private equity, it would likely be funded out of fixed income so that they would move both fixed income and private equity closer to the target weights.

MR. CENTER said Slide 22 compares PERS asset allocation and its target allocation versus the Callan public fund sponsored database, which was the peer group that they compare PERS, TRS, and the judicial system against. He said PERS has a slightly lower allocation to fixed income than most of the peers, below median, and a slightly higher allocation to real assets and alternatives versus peers. He said the overall trailing standard deviation for the PERS portfolio was just below median over 10 years which was a slightly lower realized risk versus peers.

MR. CENTER said Slide 27 showed the long-term returns for the PERS portfolio. He said that during the Global Financial Crisis, the PERS portfolio did fall pretty far as did its benchmark, but they have seen a continued uptick since that time with return patterns similar to the actuarial expected return.

MS. HARBO asked how they choose the peer groups; MR. CENTER said that they compare the PERS performance with a public fund sponsored database, which includes other public funds, U.S.-based public retirement plans, state-sponsored public retirement plans or county sponsored public retirement plans. He said they cast the widest net and use a combination of their own client performance along with purchased data from external vendors.

MR. CENTER said that Slide 28 showed a longer-term performance for PERS and TRS relative to their target index and public market proxy. He said it is a benchmark designed to have a similar return profile, given Callan's capital market expectations, but only investing in public market investments such as the Russell 3000, the MSCI all-country world index, and the Bloomberg Aggregate Index. He said it was not designed to have a similar risk profile to the PERS portfolios, but to simply have a similar long-term return profile.

MR. CENTER said the S&P 500 and the Russell 3000 were both strong performers relative to their peer group. He said that it was a difficult period for active domestic equity portfolios to outperform

the indices and for the Alaska portfolio, its structure had resulted in substantial headwinds relative to those benchmarks. He said the plan made a shift in its domestic equity portfolio over the last 18 months to move away from active management and invest passively in the S&P 600 for small cap, the S&P 900 for large cap, and a blend of internally managed and externally managed factor-based strategies. He said the factor-based strategies are designed to invest in U.S. equity securities that, over the long term, have shown a propensity to outperform the market.

MR. WILLIAMS asked if the small cap managers were the S&P 600 strategy; MR. CENTER said that it was a combination of both active and passive managers, not strictly the passive S&P 600 investments; MR. WILLIAMS asked that since their S&P is a passive strategy, should they only be looking at tracking error in terms of execution of it; MR. CENTER said that was accurate to a degree. He said it was a decision by CIO MITCHELL to implement the small cap exposure by investing in the S&P 600, but to keep the plan's benchmark as the Russell 2000. He said that while they were implementing passively using a benchmark strategy, the benchmark strategy that was being implemented differed from the actual target.

MR. CENTER said that they were working with staff on the asset allocation study, and part of the study this time, will be an equity structure analysis. He said they will be reviewing the overall public equity portfolio to either reaffirm the commitment to those factor-based strategies or to propose other alternatives.

MR. CENTER moved up to Slide 38 stating that the global ex-U.S. portfolio, or non-U.S. equity portfolio had done well. He said it differed from the U.S. portfolio in that it did not include active managers, both in the developed market space and the passive investments emerging markets equities and that it was ahead of its benchmark, 80 basis points over the longer-term six and 10 - year periods. He said the developed market portfolio represented on Slide 39 had done very well relative to the benchmarks. He said that Slide 40 showed details about the non-U.S. equity portfolio which had a strong performance from the active managers, Arrow street and Baillie Gifford.

MR. CENTER said the emerging markets portfolio was restructured a year ago and moved away from active management to mostly passive. He said that last quarter it slightly underperformed the benchmark and was down 4 percent relative to the benchmark.

MR. CENTER said the fixed income portfolio could be found on Slide 43 and showed it had outperformed its target over all time periods. He said the benchmark relative performance was ahead by over a percent over the last five years and 60 basis points over six years. He said the internally managed U.S. aggregate portfolio over the last year was up about 8.3 percent. He said the external strategies included two strategies managed by Fidelity, both of which had strong quarters with the tactical bond strategy over the last year by 6 percent, the real estate high income strategy had a strong quarter but did trail over the last year. He said that alternative fixed income was a drag on the performance over the last year with Crestline and lending strategies doing very well, but the other two opportunistic strategies were not as strong.

MR. CENTER said Slide 45 showed the opportunistic portfolio. He said there was a strong performance from the McKinley Healthcare strategy with a positive 29.3 percent return over the last year. He said the tactical asset allocation strategies by PineBridge, and Fidelity combined to return

8.4 percent which was above the return for the PERS portfolio.

MR. CENTER said the Man Group was down 9.6 percent with the overall program down about 14.8 percent. He said the program was designed to mimic the performance of alternative investments over time, such as hedge funds, which have had a difficult period. He said overall, the performance, while negative, was designed to be a diversifier to the rest of the portfolio.

MR. CENTER said Slide 46 touched on the real assets portfolio that had a strong performance from the private real estate portfolio for the quarter and over the last year relative to overall benchmarks. He said that energy had been a difficult investing space, that private energy investment was down 16 percent of the year, but overall, the real assets portfolio was up 73 basis points over the last year which was ahead of the real assets target.

MR. CENTER said in terms of the participant directed Defined Contribution plans, the PERS portfolio as of September 30 was at \$1.5 billion in assets, about 60 percent of that portfolio was invested in the target date funds or balanced funds. He said the asset flows for the PERS portfolio over the last five quarters showed the PERS DC plan was cash flow positive. He said the TRS portfolio had \$620 million in assets and was 60 percent invested in the asset allocation funds. He said while the plan remained cash flow positive, there was an uptick in cash flow withdrawals likely due to the CARES Act that permitted participants to increase withdrawals due to COVID-19. He said the Deferred Comp Plan shown on Slide 52 showed that 22 percent of its investments are in the asset allocation funds, remaining at \$1 billion as of September 30 and was slightly cash flow negative. He said the SBS fund, which was the largest fund at \$4.4 billion, was also 60 percent invested in the asset allocation funds, with a fairly stably negative cash flow.

MR. CENTER said the performance of the individual investment plan and investment options, the target date funds had performed well, relative to both benchmarks and peers. He said each one of the investment options had its own benchmark, and that as a whole, they have a lower-risk profile than their benchmarks.

MR. CENTER said Slide 58 showed the passive options which were in line with their benchmarks in a cost-effective manner. He said the Strategic Completion Fund, which was designed as an inflation hedging strategy had performed slightly ahead of its benchmark over the last year. He said the Northern Trust ESG fund, which was a passively managed environmental, social, and governance-focused smart investment strategy had slightly outperformed its benchmark over the last year as well. He said the international equity fund was ahead of its benchmark by over 5 percent and that T. Rowe Price small cap was also doing good, that all of their active options had done extremely well over the last year.

CHAIR JOHNSON recessed the meeting from 11:06 a.m. until 11:16 a.m.

9. FBI Cyber Risk

CHAIR JOHNSON introduced Special Agent FRANK REID of the FBI.

MR. REID said that he had been an agent for 10 years and started in the San Francisco Division working primarily white-collar fraud cases, investment fraud cases, and intellectual property rights, (IPR) cases, as well as child exploitation cases. He said he transferred to Juneau in April of 2018

and works everything that comes through the door. He said that he is not an expert on cybersecurity, but the Anchorage office has a specific squad that works cybersecurity. He went on to explain that the FBI has 56 field offices and 63 international offices. He said that as far as cybersecurity is concerned, the FBI is the lead federal investigative agency for cyber matters with dedicated cyber squads in every field office with a focus on intrusions as well as Internet fraud.

MR. REID said that today 58.5 percent of the world's population has access to a computer, versus 6.8 percent 20 years ago. He explained that cyber criminals are after everybody - small businesses, large businesses, universities, governments, nonprofit organizations, everyone is a potential target. He said that economics was the driving force. He said hackers would be interested in what the Board does and how they do it. He said there are some military and political advantage intelligence collection capabilities, but it could also be as simple as revenge -- someone seeking revenge on an old employer. He said that politics was a hot button issue as well as terrorism or ways to conceal infrastructure by using servers as a way to bounce around to avoid detection.

MR. REID went on to give an overview of an attack explaining the hackers would perform reconnaissance - research to gain information about the target. He said social media such as Facebook, LinkedIn, and Instagram where people put their private life out for all to see. He said hackers use this information to their advantage to manipulate the situation and get in the door.

MR. REID said that sophisticated hackers can get on networks, scan them, and find ways in and install backdoor mechanisms that allow them in, then cover their tracks so no one can figure out who they were and how they got in. He said in 2019 they received 467,361 complaints, or on average 1,300 per day, and asked the group to consider the resources allocation needed to address the issues. He said the end result of those cyberattacks resulted in \$4.5 billion in losses to U.S. victims in one year. He said hackers are using social engineering, phishing, malware, ransomware, and denial of service attacks.

MR. REID went on to explain how hot points and various proxy networks worked. He said as an example, the victim is in the United States, and the adversary is in Asia, a hacker would use proxy networks to bounce to and from to find a victim, and once they get to the victim, the hacker will appear as if they were in the United States. They will eventually get into the system and move money out and back to them in Asia. He said because of virtual private servers, and share file services, the footprint is easy to hide because of how sophisticated these actors have become and the various technologies and applications that can help hide identity through encryption.

MR. REID explained that another common method was spear phishing. He said phishing is a campaign that does not target individual victims, but hundreds and sometimes thousands of recipients. He said spear phishing is specific and is the one that he had seen a lot of successful attacks, and it is highly targeted and targets a single individual. He explained that the hacker will use social media to determine who the CEO is that works for a corporation they are targeting and the corporate directory will show who that person's assistant is and then will send a spoofed email from the CEO to that assistant asking for money. He said PayPal is another victim of hackers sending spoofed emails to people asking them to click on a link and enter all their bank card information as well as other highly personal information.

MR. REID said ransomware is an increasingly significant threat where hackers get into systems

through a spear phishing email that someone has opened. He said once they are in, they can infect the system and lock it up with the purpose of holding the servers as hostage by encrypting the system to control it for the purpose of collecting a ransom to release the files. He said last year there was \$11.5 billion in losses globally and in 2020 the losses had exceeded that number. He said ransomware is a type of malware that targets the critical data and systems for the purpose of extortion. He said that ransom attacks occur every 14 seconds. He said that they do not advocate paying the ransom because it does not guarantee anything, he also said that the Treasury Department had advised that paying ransom may be considered illegal and lead to prosecution.

MR. REID said that to avoid infection use a good antivirus software, always scan downloaded files and attachments, and if there is a question as to who or where a file came from, do not open it. He said it was extremely important to back up all the data on an external drive for restorative purposes in case of data loss at least monthly. He also said to file a complaint with the FBI if an attack happens. He said if it is a personal attach, a complaint can be filed with IC3.gov which is their online complaint center.

MR. REID showed an example of a ransomware attack on the Mat-Su Borough that happened in 2018. He said the borough discovered their computer network had been the victim of a ransomware attack that resulted in the disruption of numerous services and a temporary loss of digital files. He said credit card machines could not be used, animal shelter records were lost, and online services were inaccessible. He said some departments had to use typewriters to continue to process paperwork. He said it happened through a malicious e-mail that had been sent to a Mat-Su employee months before the attack was discovered. He said the employee opened a file link that allowed the malware to gain a foothold in the network. He said 700 devices had to be checked and scrubbed, the process took 10 weeks before they were finally back online. He said the cost to get Mat-Su back online was \$2.3 million dollars, but the Mat-Su had insurance that covered \$1 million of the damage.

MR. REID said another type of malware was Trojan viruses, they are worms that can travel through multiple machines. He said another one is business e-mail compromise, (BEC) or spoofing an email account to look almost exact to an email account that is trusted. He said in that circumstance the hacker tricks the employee into making a wire transfer to accounts belonging to a trusted person, instead the money is wired to an account controlled by the hacker. He said the funds are generally transferred to a U.S. account in the name of a witting or unwitting money mule who then sends it overseas. He said that there should be protocols in place regarding significant money transfer requests. He said that in 2019 the FBI had received 23,775 complaints related to BEC fraud which resulted in \$1.7 billion in losses and since 2015 there has been an increase of 1,300 percent in those types of incidents.

MS. HARBO asked what kind of insurance the Mat-Su Borough had; MR. REID said that he did not know, but it could be a general policy. He said the reality is this affects the consumer because insurance companies are not going to not make money, they will have to adjust their rates to take into account those payments they are paying out; MS. HARBO asked if they all are paying for it; MR. REID said absolutely 100 percent.

MR. REID said when it comes to tracking down cyber criminals outside the U.S. border, the legal

process does not work overseas without assistance through a mutual agreement between countries to share information, which is a lengthy process. He said that hackers are able to use this and it makes it difficult to track them and by the time they figure out who the criminals are, the money is gone. MS. HARBO said that the presentation was fantastic but it made her want to throw her computer away and crawl into a hole; MR. REID agreed and said that everyone needed to be careful with what they do and how they do it.

CHAIR JOHNSON asked what the success level in recovering things on this that would cause people to not think the FBI was overburdened by so many complaints so why bother; MR. REID said that a lot of the investigations are ongoing and he cannot comment on them. He did say when things occur in real-time, they are more successful than coming in months after the fact and the hacker has covered their tracks.

MR. REID explained a BEC fraud case called Operation reWired. They arrested 281 people, 74 of them were US citizens, in 10 different countries. He said they seized \$3.7 million and were able to recover \$118 million in fraudulent transfers. He said once discovered, there is a 72-hour window where the FBI can stop the hackers; they can work with the banks and get the money back. He said it is important for businesses to act immediately once the activity is discovered.

MR. REID said the things that people can do to keep this from happening is to keep software updated. He said network segregation can be set up so if one fails, the other network can pick it up. He said to make sure the networks are encrypted and back up everything off of the network and use two-factor authentication wherever possible. He also said to think before clicking a link in an email; pay attention to email addresses to make sure they are the legitimate address of a trusted source. He said that employees should be trained on cybersecurity threats and best practices, so they understand the severity of a single action. He said it was also important to watch the outbound traffic - what sites employees are visiting.

MR. REID said to verify the changes of vendor payment location by adding additional two-factor authentication, such as having a secondary sign-off to make sure everybody is on the same page and to regularly monitor financial accounts.

MR. REID said that cookies on websites are another way to track movements and he discourages the use of them. He said a good idea would be to set up a burner e-mail, something not typically used for online shopping or bill pay where it is not easily associated back to a person. He said never use a debit card to make online purchases because if that site gets hacked it could be a potential problem for that bank account. He said to always devote one card to online shopping to avoid getting all of the accounts hacked. He said to avoid putting too much personal information on social media accounts, check privacy settings to make sure that only friends and family can view the account.

MR. REID suggested having a pre-established relationship with vendors who can take care of malware immediately. He said to engage the FBI within the 72-hour window to stop the attack and loss of funds. He said that if a device is infected, to leave it on but disconnect it from the network.

MR. REID said one big threat today was travel. He said when traveling overseas, the Constitution

does not go along. He said to be conscious of the surroundings, who could be listening and watching, and gifts. He said to avoid transporting devices such as computers, phones, and thumb drives in checked baggage, to keep them in a carry-on. He said to not take laptops or phones that are used every day and only take the data that is needed. He said to set up burner accounts such as e-mail and messaging apps, and use burner devices

CHAIR JOHNSON recessed the meeting from 12:22 p.m. until 1:16 p.m.

10. Fixed Income Presentation

MR. HANNA introduced investment officers VICTOR DJAJALIE and CASEY COLTON and took the opportunity to recognize the outstanding job the fixed income team had done navigating the current market with a strong one-year performance of 8.4 percent, placing them high in Callan's fixed income universe.

MR. DJAJALIE introduced the staff members. He said there were five of them and that he oversees the group. He said MR. COLTON runs the government and mortgage-backed securities, NICK ORR specialized in infrastructure products, primarily on the longer CMBS, EMILY HOWARD manages the short-term portfolio and is also the asset-backed specialist and STEPHANI PHAM helps on the credit side and supports the operation analytics.

MR. DJAJALIE said that Slide 5 showed their target allocation for FY21, with fixed income at 22 percent of the allocation and three-quarters of the assets under management of the 22 percent was managed internally by the internal fixed income team.

MR. DJAJALIE said Slide 7 showed the 10-year Treasury yields, and over the past 40 years, risks had been trending lower and likely to remain low for the foreseeable future as global central banks continue to promote an easy money policy. He said that he had seen that the 10-year Treasury yield was 97 basis points which was still attractive especially considering over 30 percent of the global sovereign debt outstanding has a negative yield.

MR. DJAJALIE said Slide 8 showed that 2020 had been unprecedented with a record issuance. He said \$1.6 trillion worth of deals hit the market with deals often well oversubscribed by the market participants and was well absorbed with over 70 percent in the secondary.

MR. DJAJALIE said Slide 9 showed the overall health of the U.S. companies. He said since the Global Financial Crisis, leverage had been gradually increasing. He said the rates are low and companies take advantage of that by issuing a lot of debt.

MR. DJAJALIE said that Slide 10 showed that the fundamental U.S. corporates were deteriorating. He said that did not matter, the rate spread continues to be well supported with a lot of demand from domestic and foreign investors.

MR. HIPPLER asked if the spreads were over the T-bill rate: MR. DJAJALIE said that it's over Treasuries and that where they are now with pricing, it makes sense to deal all in fixed income.

MR. DJAJALIE said Slide 11 showed the role of fixed income in a broadly diversified portfolio.

He said that it serves three functions. He said the first function was portfolio diversification where fixed income has a lower-risk profile and is less correlated to other asset classes, so if it were combined in a portfolio, it would reduce the risk.

MR. DJAJALIE the second was the yield. He said fixed income provides a steady stream of yield for income that can be used to pay bills. He said the third was liquidity. He said fixed income provides an important liquidity function in the portfolio by facilitating benefit payments and portfolio rebalancing during equity market drawdowns.

MR. DJAJALIE said Slide 12 showed the historical drawdowns of the S&P and Bloomberg Barclays Aggregate Index. He said he used the Barclays Agg Index as a proxy for fixed income because that is the mandate within the ARM Board.

MR. DJAJALIE explained that Slide 13 showed how the performance was during the recession. He said fixed income had consistently generated positive returns in all of the recessions when the equity decline was the greatest.

MR. DJAJALIE said that Slide 14 showed the average annual fixed income flows that were handled daily. He said the ARM Board portfolios manage 254 contributions and 142 redemptions which equated to \$2.6 billion in contributions and over \$700 million in redemptions.

MR. COLTON mentioned that the ARM Board's short-term fund had outperformed by an average of 25 basis points annually for the past 10 years and the ARM Board's Treasury pool outperformed by nearly as much by an average of 18 basis points over its life of 9-1/4 years.

MR. COLTON explained that the stress testing they do under multiple interest rate regimes is a form of quality control. He said they look for different combinations of bonds held in the right proportion to modestly outperform regardless of change in short-term, immediate-term, or long-term interest rates. He said another consideration and practice is that a basis point saved in transactions cost is worth as much as a basis point of yield. He said the U.S. Treasury notes and bonds they hold are among their best options for liquidity as they are readily available in size and at very low round-trip trading costs.

MR. COLTON said that advances have helped them test more innovative structures over a wider range of scenarios, but ex-post interest rates will follow one path and not necessarily the one they choose to test, so controlling risk means they have to carefully choose how to test and combine bonds.

MR. COLTON said they compare the expected performance of each pair over a carefully chosen range of interest rate scenarios. He said that to manage a larger portfolio of 800 bonds out of an aggregate universe of more than a million, they resort to generalizations, such as grouping bonds which often trade together. He said that Slide 19 showed the longer fund, displaying some of these generalizations, which help simplify where the risk is being taken. He said their current focus was to overweight corporate and asset-backed security exposure, and underweight exposure to U.S. Treasury and mortgage-backed securities. He said Slide 20 was similar to Slide 19 except it was for

the short-term fund, which also had overweight to asset-backed securities.

MR. COLTON said that Slide 21 showed that the ARM Board's short-term fund had outperformed by an average of 25 basis points over the past 10 years and was similar over the shorter time periods as well. He said that the ARM Board's now-closed U.S. Treasury pool outperformed by 18 basis points over its 9-1/4-year life.

11. Liquidity and Risk Management

MR. CARSON said that he would discuss the biannual ARM Board risk reporting as provided by the risk platform truView. He said that every six months State Street Global Exchange collects portfolio data, including asset allocation, asset targets, public market constituent data, and runs it through their risk analytic platform. He said the staff then analyzes the reporting provided by truView to answer several questions including:: Where is the allocation of risk compared to the ARM Board's asset allocation targets; Are there any significant contributors of risk that are outside of expectations of what should occur; What is the probability and magnitude of losses; and How would the current portfolio perform during periods of market stress; MR. CARSON said that Slide 5 showed the broad domestic equity appeared to be overweight by 2 percent and fixed income underweight by 2 percent on June 30th, but staff and the portfolio were right in the middle of trading to meet the FY21 targets. He said the events in the first half of 2020 caused portfolio volatility to jump from 7.8 percent, reported as of December 2019, to 12.6 percent, but that it continued to reflect a lower volatility than the 13.6 percent forward portfolio risk expectations derived from the Callan capital market assumptions.

MR. CARSON summarized the points of Slide 6. He said value-at-risk was the expected loss at a given probability-in-time period. He said in the analysis, they used 95 percent. He said conditional value-at-risk, or CVaR, was the weighted average of the extreme losses beyond value-at-risk, and that qualified expected losses in the extreme tail beyond the value-at-risk cutoff point.

MR. CARSON said Slide 7 showed value-at-risk was 10.3 percent in the June 2020 report, which was an increase from 7.3 percent in December and was within staff expectations. He said public equities contributed about 56 percent of portfolio value-at-risk, and this is expected from the riskier growth asset class that also has a significant portfolio allocation.

MR. CARSON said that Slide 8 showed that total equity market risk was within expectations. He said the one-year and five-year beta measurements were close to benchmark, indicating the portfolio was close to market risk. He reminded the Board that beta was a measure of the volatility of the portfolio compared to the benchmark.

MR. CARSON explained that Slide 9 showed the portfolio-level impact of several truView scenarios. He said the scenarios were based on historical events as well as predictive scenarios based on events that had not occurred. He said for predictive scenarios, truView provides a range of outcomes, from most severe to mild. He said for those predictive scenarios he provided the two most severe outcomes. He said there was a mixture of outperformance and under performance given the set of scenarios, but there was no significant underperformance for any one scenario. He said he thought that it was an indication that the portfolio overall was not exposed to specific risks that would cause underperformance for the scenarios shown on the slide.

MR. CARSON said that Slide 10 showed portfolio liquidity, which comes from several sources. He said the first was from state contributions to the retirement plans, then cash income from the investments themselves; and finally, from the selling of assets to satisfy liquidity needs. He explained that the plan's primary objective was to make current and future benefit payments and to be consistent with the objective, the plans must rebalance back to the target asset allocations, and the plans must fund investment prospects and commitments. He said that each of those things were important in driving growth which satisfies future benefit payments.

MR. CARSON explained that state contributions and investment income were the less volatile and more easily managed liquidity sources, but in practice, incoming contributions are deployed and investment income as a reinvestment consistent with the target asset allocation; so during normal market conditions, selling assets and coordinating income to manage cash flows was accomplished without a lot of friction. He said portfolio rebalancing and liquidity were the mechanism employed to sell assets, to fund outflows, and to keep the actual asset class weights near their targets.

MR. CARSON explained that Slide 11 showed asset allocation of targets approved by the Board which included ranges or bands specific to each of the asset class targets. He said that it allows drift from target weights, which reduces the frequency and urgency to rebalance. He said the Board's decision to increase the fixed income band to plus or minus 10 percent at the December 2019 meeting increased the portfolio's ability to withstand a significant equity drawdown and potentially reduced the requirement to rebalance during periods of market stress. He said that by their nature, illiquid investments do not lend well to the rebalancing process; that the fund's investments in those asset classes were usually not readily accessible, so in the event of a significant equity drawdown, the fixed income asset class is the primary source of rebalance the portfolio.

MR. CARSON said that Slide 12 showed that in 1989 an investor could allocate three-quarters of the portfolio to cash and still hit the 7.5 percent return target with very low risk. He said that in 2020 the portfolio was much riskier and more complex but with the same expected return.

MR. CARSON said that they need to make payments and rebalance the portfolio, so they need liquidity, then they need to incur risk to generate growth to fund future payments, so the expectation is to be compensated for risk, but the risk must be carefully managed.

MR. CARSON said that Slide 13 showed the results of an analysis of 2019 data provided by NASRA to compare the Alaska PERS and TRS portfolio composition against peers with some allocation to alternative assets. He said the ARM Board's FY21 allocation of liquid assets was close to the median peer allocation but with higher-than-median net outflows, as the plans are closed and mature. He said the chart also showed the allocation of liquid assets amongst peers tends to increase as net outflows increase.

MR. CARSON said Slide 14 showed a similar analysis that staff provided last December which analyzed the impact equity drawdown would have on rebalancing, but instead of changing the width of the bands around the fixed income target as they recommended last December, they changed the target and left the bands consistent as a plus or minus 10 percent. He said given the current allocation to liquid fixed income, the plans can sustain a 43 percent equity drawdown. He said by

holding the allocation to public equity constant and reducing the allocation to liquid fixed income down 12 percent, the portfolio can sustain a 35 percent equity drawdown.

MR. CARSON said Slide 15 showed the impact of partial rebalancing, where trades are executed to bring the allocations within the allowed ranges but not fully to target. He said there are advantages to partial rebalancing, such as if the portfolio experiences a significant equity drawdown and is pressed up against the edges of the allowable bands, a full rebalance back to target would require trading, which may incur significant transaction costs, but a partial rebalance to get back within the bands, but not fully back to target could buy time from the selective or timely trading or for markets to naturally recover. He said another advantage is the portfolio's ability to sustain an equity drawdown increases significantly with the partial rebalance.

MR. CARSON said that Slide 16 was the summation of his presentation and showed that the first half of 2020 saw significant market volatility increasing overall portfolio risk, but risk metrics continued to remain within staff expectations. He said the ARM Board, along with its peers, are facing a downward trend in return expectations and have responded by increasing portfolio complexity and risks. He said staff analysis suggests the plan's current liquidity profile was sufficient to sustain all but the most severe market drawdowns and that there was room to increase the allocation to the illiquid asset classes and still satisfy liquidity requirements.

CHAIR JOHNSON asked whether risk is just simply whether or not we have the ability to meet liquidity needs at various levels? MR. CARSON said his presentation was to focus on one of the risks that if it failed, then the outcome would be catastrophic. He said there could be a failure to meet benefit payments if liquidity was tied up, or benefit payments could be met, but the cost of making those cash outflows could be significant enough to have future implications for meeting the outflows. MR. CARSON said there was liquidity risk and market risks. He said his presentation focused on investment risk and liquidity risk, but that was not to say that a failure in any of the other facets of risk would not have a catastrophic impact. He said as the Board assesses their tolerance of risk, they also need to assess tolerance of risk and how the different facets of risk add up to the overall risk to the plans.

MR. HANNA said that when they come back to the Board in March, they will have a deeper evaluation of liquidity risk. He said they may approach it from a simulation perspective to try to put that in context and to a certain degree it is a process of triangulation and taking a look from a prudent investor perspective, what the peer set is doing and how the Board compares to that peer set.

MR. HIPPLER asked if leverage could also enhance liquidity and take away some of the need for the liquidity benefits of the fixed income portfolio; MR. HANNA affirmed that was the case and that one of the solutions from a rebalance perspective was to allow for a certain amount of leverage and to use futures to do some of the rebalancing.

12. Investment Actions

Action: Amendment to IAC Contracts

MR. HANNA said that the IAC had been a valuable source of advice and counsel to the ARM Board over the years, and with the ARM Board approval, an Alaska statute allows the ARM Board

IAC to provide investment advice to other state agencies. He said they were looking to expand the role of the IAC to include this advice to the state more generally. He said they were looking to amend the IAC contracts so the Commissioner of Revenue could also benefit from this resource. The compensation for this service would be separate from the compensation for the ARM Board - there would be an additional retainer and separate daily per diem for the new state responsibilities.

MR. HANNA said that the recommendation is that the Alaska Retirement Management Board approve the expansion of the IAC's services to include the state assets under the fiduciary responsibility of the Commissioner of Revenue.

MS. HARBO said she thought they had an additional sentence. After some discussion, CHAIR JOHNSON read the revised recommendation: The Alaska Retirement Management Board approves the expansion of the IAC services to include the state assets under the fiduciary responsibility of the Commissioner of Revenue, provided that the IAC members will be compensated separately for services provided directly to the state.

MS. HARBO SO MOVED. MR WILLIAMS seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

XI. UNFINISHED BUSINESS - None.

XII. NEW BUSINESS - None.

XIII. OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD - None.

XV. INVESTMENT ADVISORY COUNCIL COMMENTS

DR. MITCHELL said that he wanted to compliment the Board and staff on the transitions that had taken place with the new Board members; a new CIO and new liaison officer, all in a rapid succession. He said the transition had been seamless and the new incumbents were as dedicated and professional and hard-working as one could hope for. He also said that he agreed with MS. HARBO's hope that once they get back to face-to-face in-person meetings, they consider having some of them in Anchorage. He also said that he had heard good presentations on private equity and had been a supporter of it since the ARM Board first began investing in that asset class.

DR. MITCHELL said that much of the excellent performance was due to the quality of work of staff, of Callan, the managers - Abbott and Pathway, and the general partners who actually invest the funds. He said a few other factors that are just as important is the 40-year decline in interest rates, a decades-long rise in the stock market, and the employment of leverage. He said that equity managers rely on two critical elements to make money: leverage and benign stock market. He said buyout managers employ 60 to 80 percent leverage in their acquisition deals, particularly in the intermediate and later stage investment round. He said borrowing costs have gone down during the era of the private equity boom, to the point where leverage is almost free, at the same time the stock market has gone up, particularly in the growth sector. He said it had been a perfect storm for private

equity and to not confuse brilliance with a bull market.

MS. RYERSON commented that adjusting return expectations was never politically popular, but sometimes that made sense to look at that in conjunction with trying to go out on the risk spectrum and get more of a return.

MS. RYERSON said that Bridgewater's presentation was a bit disturbing in that the next couple of years would be a difficult environment and would depend on how the governments deal with what happens on what can be done with the portfolio.

DR. JENNINGS said that the global risk report put out by the World Economic Forum was useful. He said "infectious diseases" was 10th on the impact scale, and that pandemics are an expected and knowable risk. He said that there were two cyber risks on the scale that were higher in likelihood and impact than infectious diseases and he appreciated staff bringing these conversations to the floor. He said that he encouraged the Board to Google the World Economic Forum to read the report. He said he has made a habit of looking at it each year and over the years it had opened his eyes to different risks.

XVI. TRUSTEE COMMENTS

MS. HARBO thanked MR. WEST for all his services to the Board over the years and will miss his stories and comments. She also thanked the IAC members for all their comments. Lastly, she thanked the great staff at both Revenue and Administration for all the work they do for the retirees, actives, and all the help they give the beneficiaries.

MR. WILLIAMS said that he enjoyed the meetings; that they gave a lot of time for reflection. He also said that he had been thinking about MS. RYERSON'S question about the amount of risk they should take and that he has different feelings about it at different points in time.

MR. WILLIAMS requested the CHAIR JOHNSON forward the email that came in from a member regarding challenges with trying to cash out some of their deferred compensation to Division of Retirement and Benefits to get some action. He said that they may have the best intentions, but if that is not what members' experiences are, they have to learn from that and find ways to improve.

XVII. FUTURE AGENDA ITEMS - None.

XVIII. ADJOURNMENT

There being no objection and no further business to come before the Board, the meeting was adjourned at 2:35 p.m. on December 4, 2020, on a motion made by MS. HARBO and seconded by COMMISSION MAHONEY.

Chair of the Board of Trustees
Alaska Retirement Management Board

ATTEST:

Corporate Secretary

Note: An outside contractor recorded the meeting and prepared the summary minutes. For in-depth discussion and more presentation details, please refer to the recording of the meeting and presentation materials on file at the ARMB office.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Retirement System Membership Activity
as of December 31, 2020

ACTION: _____

DATE: March 18, 2021

INFORMATION: X

BACKGROUND:

Information related to PERS, TRS, JRS, NGNMRS, SBS, and DCP membership activity as requested by the Board.

STATUS:

Membership information as of December 31, 2020.

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report March 18, 2021

Retirement System Membership Activity as of December 31, 2020

Attached for your information are the membership statistics for the quarter ending

- December 31, 2020

We see a net increase in active members from last quarter, all in DCR members:

- PERS Tier 1-3 active members decreased from 10,963 to 10,780 or a decrease of 183.
- PERS DCR active members increased from 23,755 to 24,352 or an increase of 597.
- PERS active members had a net increase of 414.

- TRS Tier 1-2 active members increased from 3,808 to 3,819 or an increase of 11.
- TRS DCR active members increased from 6,051 to 6,432 or an increase of 381.
- TRS active members had a net increase of 392.

Retiree counts have changed in the following manner:

- PERS retirees increased from 36,466 to 36,565 or an increase of 99 (all tiers).
- TRS retirees decreased from 13,340 to 13,327 or a decrease of 13 (all tiers).

MEMBERSHIP STATISTICS AS OF SEPTEMBER 30, 2020

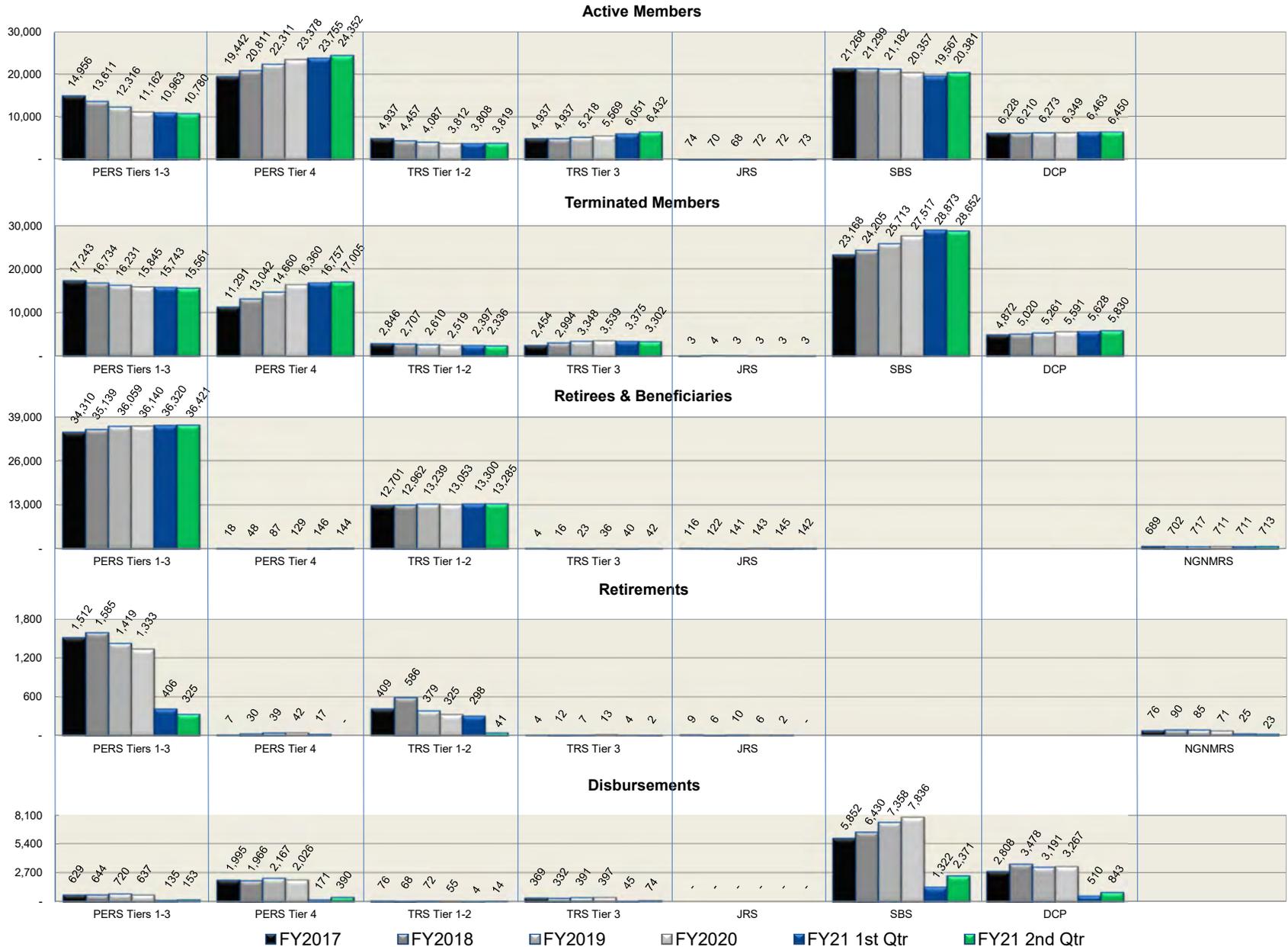
	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DCR	SYSTEM	DB			DCR	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	795	2,550	7,618	10,963	23,755	34,718	199	3,609	3,808	6,051	9,859	72	n/a	19,567	6,463 ^A
Terminated Members															
Entitled to Future Benefits	268	1,767	3,166	5,201	1,788	6,989	26	638	664	726	1,390	2	n/a	28,873	5,628 ^A
Other Terminated Members	1,019	2,054	7,469	10,542	14,969	25,511	237	1,496	1,733	2,649	4,382	1	n/a	n/a	n/a
Total Terminated Members	1,287	3,821	10,635	15,743	16,757	32,500	263	2,134	2,397	3,375	5,772	3	n/a	28,873	5,628
Retirees & Beneficiaries	22,623	8,862	4,835	36,320	146	36,466	10,111	3,189	13,300	40	13,340	145	711	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,878	5,878	n/a	n/a	n/a	1,508	1,508	n/a	n/a	2,870	2,731
Retirements - 1st QTR FY21	68	167	171	406	17	423	61	237	298	4	302	2	25	n/a	n/a
Full Disbursements - 1st QTR FY21	9	47	79	135	138	273	2	2	4	33	37	-	n/a	123	45
Partial Disbursements - 1st QTR FY21	n/a	n/a	n/a	n/a	33	33	n/a	n/a	n/a	12	12	n/a	n/a	1,199	465

^A Revised from prior report

MEMBERSHIP STATISTICS AS OF DECEMBER 31, 2020

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DCR	SYSTEM	DB			DCR	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	752	2,499	7,529	10,780	24,352	35,132	196	3,623	3,819	6,432	10,251	73	n/a	20,381	6,450
Terminated Members															
Entitled to Future Benefits	261	1,701	3,128	5,090	1,830	6,920	24	607	631	689	1,320	2	n/a	28,652	5,830
Other Terminated Members	1,010	2,033	7,428	10,471	15,175	25,646	234	1,471	1,705	2,613	4,318	1	n/a	n/a	n/a
Total Terminated Members	1,271	3,734	10,556	15,561	17,005	32,566	258	2,078	2,336	3,302	5,638	3	n/a	28,652	5,830
Retirees & Beneficiaries	22,502	8,970	4,949	36,421	144	36,565	10,062	3,223	13,285	42	13,327	142	713	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,911	5,911	n/a	n/a	n/a	1,508	1,508	n/a	n/a	3,006	2,884
Retirements - 2nd QTR FY21	52	144	129	325	-	325	8	33	41	2	43	-	23	n/a	n/a
Full Disbursements - 2nd QTR FY21	16	51	86	153	390	543	1	13	14	74	88	-	n/a	471	151
Partial Disbursements - 2nd QTR FY21	n/a	n/a	n/a	n/a	106	106	n/a	n/a	n/a	28	28	n/a	n/a	1,900	692

Alaska Division of Retirement and Benefits
FY 2021 QUARTERLY REPORT OF MEMBERSHIP STATISTICS
 Annual & Quarterly Trends as of December 31, 2020



LEGEND

- Active Members** - All active members at the time of the data pull, except SBS & DCP, which are counts of contributors during the final quarter of each period.
- Terminated Members** - All members who have terminated without refunding their account, except SBS & DCP, which are counts of members with balances at the end of the period less active members.
- Retirees & Beneficiaries** - All members who have retired from the plans, including beneficiaries eligible for benefits.
- Managed Accounts** - Individuals who have elected to participate in the managed accounts option with Empower.
- Retirements** - The number of retirement applications processed.
- Full Disbursements** - All types of disbursements that leave the member balance at zero.
- Partial Disbursements** - All types of disbursements that leave the member balance above zero. If more than one partial disbursement is completed during the quarter for a member, they are counted only once for statistical purposes.

ALASKA RETIREMENT MANAGEMENT BOARD
STAFF REPORT
Division of Retirement & Benefits Report
March 18, 2021

Summary of Monthly Billings / Buck Global LLC

Attached for your information are the quarterly payments related to actuarial services provided by the Division's consulting actuary, Buck Global LLC.

Items listed represent regular and non-regular costs incurred under our current contract.

The listed costs are charged to the System or Plan noted on the column headings.

Summary through the six months ended December 31, 2020

There are no new items for this quarter.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Summary of Monthly Billings - ACTION: _____
Buck Global LLC
DATE: March 18, 2021 INFORMATION: X

BACKGROUND:

AS 37.10.220(a)(8) prescribes that the Alaska Retirement Management Board (Board) “coordinate with the retirement system administrator to have an annual actuarial valuation of each retirement system prepared to determine system assets, accrued liabilities, and funding ratios....”

As part of the oversight process, the Board has requested that the Division of Retirement & Benefits provide quarterly summary updates to review billings and services provided for actuarial valuations and other systems’ request.

STATUS:

Attached are the summary totals for the six months ended December 31, 2020.

**Buck
Billing Summary
For the Three Months Ended September 30, 2020**

	<u>PERS</u>	<u>TRS</u>	<u>JRS</u>	<u>NGNMRS</u>	<u>EPORS</u>	<u>AHF</u>	<u>RHF</u>	<u>SBS</u>	<u>DCP</u>	<u>TOTAL</u>
Actuarial valuations	\$ 54,560	43,653	5,457	5,455	-	-	-	-	-	\$ 109,125
KPMG audit information request	1,245	498	10	35	-	-	-	-	-	1,788
ARMB presentations and meeting attendance	3,411	3,414	-	-	-	-	-	-	-	6,825
FY20 final PERS/TRS contribution rates	3,411	3,414	-	-	-	-	-	-	-	6,825
GASB 67/74	7,572	6,060	759	759	-	-	-	-	-	15,150
GASB 68/75	22,722	18,180	2,274	2,274	-	-	-	-	-	45,450
Salary floor discussion	1,375	-	-	-	-	-	-	-	-	1,375
Projections	6,750	6,750	-	-	-	-	-	-	-	13,500
TOTAL	\$ 101,046	81,969	8,500	8,523	-	-	-	-	-	\$ 200,038
For the Three Months Ended September 30, 2019	\$ 147,695	107,666	17,109	15,503	-	-	8,799	-	-	\$ 296,772

For the Three Months Ended December 31, 2020

	<u>PERS</u>	<u>TRS</u>	<u>JRS</u>	<u>NGNMRS</u>	<u>EPORS</u>	<u>AHF</u>	<u>RHF</u>	<u>SBS</u>	<u>DCP</u>	<u>TOTAL</u>
Actuarial valuations	\$ 54,560	43,653	5,457	5,455	-	-	-	-	-	\$ 109,125
KPMG audit information request	2,908	1,163	22	82	-	-	-	-	-	4,175
ARMB presentations and meeting attendance	3,411	3,414	-	-	-	-	-	-	-	6,825
FY20 final PERS/TRS contribution rates	3,411	3,414	-	-	-	-	-	-	-	6,825
GASB 67/74	7,572	6,060	759	759	-	-	-	-	-	15,150
GASB 68/75	22,722	18,180	2,274	2,274	-	-	-	-	-	45,450
Projections	6,750	6,750	-	-	-	-	-	-	-	13,500
TOTAL	\$ 101,334	82,634	8,512	8,570	-	-	-	-	-	\$ 201,050
For the Three Months Ended December 31, 2019	\$ 274,942	137,641	17,165	7,722	-	-	5,747	-	-	\$ 443,217

Summary through the Six Months Ended December 31, 2020

	<u>PERS</u>	<u>TRS</u>	<u>JRS</u>	<u>NGNMRS</u>	<u>EPORS</u>	<u>AHF</u>	<u>RHF</u>	<u>SBS</u>	<u>DCP</u>	<u>TOTAL</u>
Actuarial valuations	\$ 109,120	87,306	10,914	10,910	-	-	-	-	-	\$ 218,250
KPMG audit information request	4,153	1,661	32	117	-	-	-	-	-	5,963
ARMB presentations and meeting attendance	6,822	6,828	-	-	-	-	-	-	-	13,650
FY20 final PERS/TRS contribution rates	6,822	6,828	-	-	-	-	-	-	-	13,650
GASB 67/74	15,144	12,120	1,518	1,518	-	-	-	-	-	30,300
GASB 68/75	45,444	36,360	4,548	4,548	-	-	-	-	-	90,900
Salary floor discussion	1,375	-	-	-	-	-	-	-	-	1,375
Projections	13,500	13,500	-	-	-	-	-	-	-	27,000
TOTAL	\$ 202,380	164,603	17,012	17,093	-	-	-	-	-	401,088
Summary through the Six Months Ended December 31, 2019	\$ 422,637	245,307	34,274	23,225	-	-	14,546	-	-	\$ 739,989

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

**Disclosure - Calendar Update
March 18, 2021**

The 4th Quarter Disclosure Memorandum and Communications Memorandum are included in the packet; no disclosure transactions require additional review or discussion.

The remaining 2021 meeting calendar is attached, along with a DRAFT of the 2022 ARMB Calendar. The ARMB website will be updated to reflect the most current calendars.

Nothing further to report.

**ALASKA RETIREMENT MANAGEMENT BOARD
M E M O R A N D U M**

To: ARMB Trustees
From: Alysia Jones
Date: March 3, 2021
Subject: Financial Disclosures

As required by AS 37.10.230 and Alaska Retirement Management Board policy relating to investment conduct and reporting, trustees and staff must disclose certain financial interests. We are hereby submitting to you a list of disclosures for individual transactions made by trustees and staff.

4th Quarter – October 1, 2020 to December 31, 2020

Name	Position Title	Disclosure Type	Disclosure Date
Victor Djajalie	State Investment Officer	Equities	10/2/2020
Victor Djajalie	State Investment Officer	Equities	10/15/2020
Pamela Leary	Director of Treasury	Equities	12/09/2020
Hunter Romberg	Treasury Accounting Staff	Equities	1/04/2021
Tina Martin	Treasury Accounting Staff	Equities	1/05/2021
Michelle Prebula	State Investment Officer	Equities	1/12/2021
Allen Hippler	ARMB Trustee	Equities	2/19/2021

ALASKA RETIREMENT MANAGEMENT BOARD
M E M O R A N D U M

To: ARMB Trustees
From: Alysia Jones
Date: March 3, 2021
Subject: Communications & Information Requests

Communications to Trustees

The following is a list of communications directed to the Board, that were received since the ARMB December 3-4, 2020 meeting.

Name	Type	Contact Date	Topic
Eileen Wagner	Email	2/07/2021	Financial prospects of oil companies

Public Records Requests

From December 2, 2020 to February 28, 2021

Topics	# of Requests	Description
Quarterly Investment Info.	1	Investment pools, hedge funds/absolute return, real estate, private debt
Meeting Materials	3	Presentations from past meetings, minutes, audio files, transcripts.
Portfolio of Pension Fund	1	
Procurement / Contracts	3	RFI related inquiries, contract terminations

ALASKA RETIREMENT MANAGEMENT BOARD 2021 Meeting Calendar

DATE	LOCATION	DESCRIPTION
April 29 Thursday	TBD	Actuarial Committee <i>*As necessary: follow-up/additional discussion/questions on valuations</i>
April 30 Friday	TBD	Board of Trustees Meeting <i>*As necessary</i>
June 16 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
June 17-18 Thursday - Friday	Juneau, AK	Board of Trustees Meeting: <i>*Final Actuary Reports/Adopt Valuation</i> <i>*Adopt Asset Allocation</i> <i>*Performance Measurement - 1st Quarter</i> <i>*Manager Presentations</i>
September 22 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
September 23-24 Thursday - Friday	Juneau, AK	Board of Trustees Meeting: <i>*Set Contribution Rates</i> <i>*Audit Results/Assets – Auditor</i> <i>*Approve Budget</i> <i>*Performance Measurement – 2nd Quarter</i> <i>*Real Estate Annual Plan</i> <i>*Real Assets Evaluation – Callan LLC</i> <i>*Manager Presentations</i>
October 13 Tuesday (placeholder)	Teleconference	Audit Committee
December 1 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
December 2-3 Thursday-Friday	Juneau, AK	Board of Trustees Meeting: <i>*Audit Report - DRB Auditor</i> <i>*Performance Measurement – 3rd Quarter</i> <i>*Manager Review (Questionnaire)</i> <i>*Private Equity Evaluation - Callan LLC</i> <i>*Review Private Equity Annual Plan</i> <i>*Manager Presentations</i>
NOTE: Meeting locations and topics are subject to change.		

DRAFT

ALASKA RETIREMENT MANAGEMENT BOARD 2022 Meeting Calendar

DATE	LOCATION	DESCRIPTION
March 16 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
March 17-18 Thursday-Friday	Juneau, AK	Board of Trustees Meeting: <i>*Performance Measurement – 4th Quarter</i> <i>*Buck Draft Actuarial Report/GRS Draft Actuary Certification</i> <i>*Capital Markets – Asset Allocation</i> <i>*Manager Presentations</i>
April 28 Thursday	Teleconference	Actuarial Committee <i>*As necessary: follow-up/additional discussion/questions on valuations</i>
April 29 Friday	Teleconference	Board of Trustees Meeting <i>*As necessary</i>
June 15 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
June 16-17 Thursday - Friday	Anchorage, AK	Board of Trustees Meeting: <i>*Final Actuary Reports/Adopt Valuation</i> <i>*Adopt Asset Allocation</i> <i>*Performance Measurement - 1st Quarter</i> <i>*Manager Presentations</i>
September 14 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
September 15-16 Thursday - Friday	Anchorage, AK	Board of Trustees Meeting: <i>*Set Contribution Rates</i> <i>*Audit Results/Assets – Auditor</i> <i>*Approve Budget</i> <i>*Performance Measurement – 2nd Quarter</i> <i>*Real Estate Annual Plan</i> <i>*Real Assets Evaluation – Callan LLC</i> <i>*Manager Presentations</i>
October 11 Tuesday (placeholder)	Teleconference	Audit Committee
November 30 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Operations Committee Defined Contribution Plan Committee
December 1-2 Thursday-Friday	Anchorage, AK	Board of Trustees Meeting: <i>*Audit Report - DRB Auditor</i> <i>*Performance Measurement – 3rd Quarter</i> <i>*Manager Review (Questionnaire)</i> <i>*Private Equity Evaluation - Callan LLC</i> <i>*Review Private Equity Annual Plan</i> <i>*Manager Presentations</i>

NOTE: Meeting locations and topics are subject to change.

DRAFT



Chief Investment Officer Report

March 18, 2021

1. CIO Update
2. Watch List:
 - a. No managers currently on the watch list
 - b. Watch list recommendation
3. Contracts
 - a. 10/12/20 T. Rowe Price Stable Value Amendment
 - b. 10/26/20 Mass Mutual Wrap Contract Update for T.Rowe/DC
 - c. 12/01/20 New York Life Wrap Contract Update for T.Rowe/DC
 - d. 12/13/20 UBS Real Estate Contract Amendment
 - e. 12/13/20 Sentinel Real Estate Contract Amendment
 - f. 12/13/20 UBS Farmland Contract Amendment
 - g. 12/13/20 Timberland Investment Resources Contract Amendment
 - h. 01/04/21 Investment Advisory Council Contract Amendments
4. Portfolio Transaction Update from November 2020 to February 2021

Individual Manager Transactions

November 2020 - February 2021

Asset Class	Total
Fixed Income	606,415,200
Broad Domestic Equity	(360,201,821)
Global Equity Ex-US	(413,213,379)
Real Assets	-
Opportunistic	167,000,000
Private Equity	-
<i>Net Buys</i>	<i>773,415,200</i>
<i>Net Sells</i>	<i>(773,415,200)</i>

Manager	Total	Asset Class	Description of Large Transactions
Fidelity Tactical Bond	250,000,000	Fixed Income	Year-end rebalancing
Short Term Pool	189,415,200	Fixed Income	Year-end rebalancing, benefit payments
ARMB Barclays Agg Fund	167,000,000	Fixed Income	Year-end rebalancing, benefit payments
ARMB Multi-factor	100,000,000	Dom. Equity	Increase to internal factor strategy
Fidelity Portfolio Signaling	85,000,000	Opportunistic	Addition to achieve Opp target
PineBridge	85,000,000	Opportunistic	Addition to achieve Opp target
SSGA Transition	(422)	Dom. Equity	
ARMB Domestic Residual Assets	(201,399)	Dom. Equity	
International Equity Residual Asset	(2,013,379)	Intl. Equity	
Schroder Investment Management	(3,000,000)	Opportunistic	
LGIMA Sci Beta Emerging Markets	(27,000,000)	Intl. Equity	Year-end rebalancing
Ballie Gifford	(33,000,000)	Intl. Equity	Year-end rebalancing
Capital Group	(38,000,000)	Intl. Equity	Year-end rebalancing
Brandes Investment Partners	(43,000,000)	Intl. Equity	Year-end rebalancing
SSGA Emerging Markets	(54,000,000)	Intl. Equity	Year-end rebalancing
LGIMA Sci Beta Developed Non-US	(58,000,000)	Intl. Equity	Year-end rebalancing
ARMB S&P 600	(116,000,000)	Dom. Equity	Year-end rebalancing
SSGA World ex-US IMI	(158,200,000)	Intl. Equity	Year-end rebalancing
ARMB S&P 900	(164,000,000)	Dom. Equity	Year-end rebalancing
ARMB Scientific Beta	(180,000,000)	Dom. Equity	Year-end rebalancing

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report March 18, 2021

Kayla Wisner, State Comptroller, Department of Revenue

As of January month-end, total plan assets were as follows: PERS - \$22.0 billion, TRS - \$10.4 billion, JRS - \$256.0 million, NGNMRS - \$46.3 million, SBS - \$4.7 billion, DCP - \$1.13 billion. Total non-participant directed plans totaled \$30.3 billion, and participant-directed plans totaled \$8.3 billion. Total assets were \$38.6 billion.

Year-to-date income was \$5.3 billion, and the plans experienced a net withdrawal of \$452.6 million. Total assets were up 14.44% year-to-date.

Internally managed assets totaled \$15.2 billion

As of month-end, all plans were within the bands of their asset allocations.

Kevin Worley, Chief Financial Officer, Division of Retirement and Benefits

Presented is the Division of Retirement and Benefits (DRB) Supplement to the Treasury Division's Financial Report as of January 31, 2021.

DRB's supplement report expands on the ARMB Financial Report column "Net Contributions (Withdrawals)" located on pages 1 and 2. DRB reports the summary totals of actual employee and employer, State of Alaska, and other revenue items, as well as benefit payments, refunds & disbursements, and combined administrative & investment expenditures. DRB's supplement report presents cash inflows and outflows for the 7-months ended January 31, 2021 (page 1) and for the month of January 2020 (page 2).

Also presented are participant-directed distributions by plan and by type for the 7-month period on page 3. This page includes Tier information on the defined benefit refunds, and vested percentage on defined contribution distributions.

"Notes for the DRB Supplement to the Treasury Report" includes information for the pension and healthcare plans. Additional information regarding other income is also presented on pages 4 and 5.

**ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT**

As of January 31, 2021

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through January 31, 2021

	Beginning Invested Assets	Investment Income ⁽¹⁾	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income ⁽²⁾
<u>Public Employees' Retirement System (PERS)</u>						
<u>Defined Benefit Plans:</u>						
Retirement Trust	\$ 9,344,522,576	\$ 1,492,986,676	\$ (122,730,375)	\$ 10,714,778,877	14.66%	16.08%
Retirement Health Care Trust	7,755,155,160	1,220,968,363	(179,448,064)	8,796,675,459	13.43%	15.93%
Total Defined Benefit Plans	<u>17,099,677,736</u>	<u>2,713,955,039</u>	<u>(302,178,439)</u>	<u>19,511,454,336</u>	14.10%	16.01%
<u>Defined Contribution Plans:</u>						
Participant Directed Retirement	1,394,890,476	272,417,275	68,096,175	1,735,403,926	24.41%	19.06%
Health Reimbursement Arrangement	477,547,046	77,613,714	26,421,328	581,582,088	21.79%	15.82%
Retiree Medical Plan	139,052,827	22,768,012	10,343,793	172,164,632	23.81%	15.79%
<u>Defined Benefit Occupational Death and Disability:</u>						
Public Employees	28,652,603	4,683,433	2,056,142	35,392,178	23.52%	15.78%
Police and Firefighters	12,730,849	2,066,717	640,471	15,438,037	21.26%	15.84%
Total Defined Contribution Plans	<u>2,052,873,801</u>	<u>379,549,151</u>	<u>107,557,909</u>	<u>2,539,980,861</u>	23.73%	18.02%
Total PERS	<u>19,152,551,537</u>	<u>3,093,504,190</u>	<u>(194,620,530)</u>	<u>22,051,435,197</u>	15.14%	16.23%
<u>Teachers' Retirement System (TRS)</u>						
<u>Defined Benefit Plans:</u>						
Retirement Trust	5,375,743,401	857,017,276	(128,642,972)	6,104,117,705	13.55%	16.14%
Retirement Health Care Trust	2,928,208,583	461,718,583	(57,682,708)	3,332,244,458	13.80%	15.92%
Total Defined Benefit Plans	<u>8,303,951,984</u>	<u>1,318,735,859</u>	<u>(186,325,680)</u>	<u>9,436,362,163</u>	13.64%	16.06%
<u>Defined Contribution Plans:</u>						
Participant Directed Retirement	581,114,042	114,328,447	15,820,073	711,262,562	22.40%	19.41%
Health Reimbursement Arrangement	140,990,637	22,844,774	6,548,114	170,383,525	20.85%	15.84%
Retiree Medical Plan	47,385,507	7,665,021	1,993,187	57,043,715	20.38%	15.84%
Defined Benefit Occupational Death and Disability	4,732,927	762,666	157,813	5,653,406	19.45%	15.85%
Total Defined Contribution Plans	<u>774,223,113</u>	<u>145,600,908</u>	<u>24,519,187</u>	<u>944,343,208</u>	21.97%	18.51%
Total TRS	<u>9,078,175,097</u>	<u>1,464,336,767</u>	<u>(161,806,493)</u>	<u>10,380,705,371</u>	14.35%	16.28%
<u>Judicial Retirement System (JRS)</u>						
Defined Benefit Plan Retirement Trust	186,740,196	30,179,376	721,006	217,640,578	16.55%	16.13%
Defined Benefit Retirement Health Care Trust	33,653,239	5,316,590	(554,457)	38,415,372	14.15%	15.93%
Total JRS	<u>220,393,435</u>	<u>35,495,966</u>	<u>166,549</u>	<u>256,055,950</u>	16.18%	16.10%
<u>National Guard/Naval Militia Retirement System (MRS)</u>						
Defined Benefit Plan Retirement Trust	42,120,154	5,257,576	(1,061,420)	46,316,310	9.96%	12.64%
<u>Other Participant Directed Plans</u>						
Supplemental Annuity Plan	4,226,458,219	573,202,625	(75,576,303)	4,724,084,541	11.77%	13.68%
Deferred Compensation Plan	998,966,337	150,399,131	(19,705,765)	1,129,659,703	13.08%	15.21%
Total All Funds	<u>33,718,664,779</u>	<u>5,322,196,255</u>	<u>(452,603,962)</u>	<u>38,588,257,072</u>		
Total Non-Participant Directed	26,517,235,705	4,211,848,777	(441,238,142)	30,287,846,340	14.22%	16.02%
Total Participant Directed	7,201,429,074	1,110,347,478	(11,365,820)	8,300,410,732	15.26%	15.43%
Total All Funds	<u>\$ 33,718,664,779</u>	<u>\$ 5,322,196,255</u>	<u>\$ (452,603,962)</u>	<u>\$ 38,588,257,072</u>	14.44%	15.89%

Notes:

(1) Includes interest, dividends, securities lending, expenses, realized and unrealized gains/losses

(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: <http://treasury.dor.alaska.gov/armb/Reports-and-Policies/Investment-Performance.aspx>

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
For the Month Ended January 31, 2021

	Beginning Invested Assets	Investment Income (1)	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (2)
<u>Public Employees' Retirement System (PERS)</u>						
<u>Defined Benefit Plans:</u>						
Retirement Trust	\$ 10,755,553,474	\$ 2,964,410	\$ (43,739,007)	\$ 10,714,778,877	-0.38%	0.03%
Retirement Health Care Trust	8,817,739,163	1,334,664	(22,398,368)	8,796,675,459	-0.24%	0.02%
Total Defined Benefit Plans	<u>19,573,292,637</u>	<u>4,299,074</u>	<u>(66,137,375)</u>	<u>19,511,454,336</u>	-0.32%	0.02%
<u>Defined Contribution Plans:</u>						
Participant Directed Retirement	1,730,834,474	(3,710,305)	8,279,757	1,735,403,926	0.26%	-0.21%
Health Reimbursement Arrangement	577,663,497	27,352	3,891,239	581,582,088	0.68%	0.00%
Retiree Medical Plan	170,633,155	3,510	1,527,967	172,164,632	0.90%	0.00%
<u>Defined Benefit Occupational Death and Disability:</u>						
Public Employees	35,082,140	879	309,159	35,392,178	0.88%	0.00%
Police and Firefighters	15,339,679	921	97,437	15,438,037	0.64%	0.01%
Total Defined Contribution Plans	<u>2,529,552,945</u>	<u>(3,677,643)</u>	<u>14,105,559</u>	<u>2,539,980,861</u>	0.41%	-0.14%
Total PERS	<u>22,102,845,582</u>	<u>621,431</u>	<u>(52,031,816)</u>	<u>22,051,435,197</u>	-0.23%	0.00%
<u>Teachers' Retirement System (TRS)</u>						
<u>Defined Benefit Plans:</u>						
Retirement Trust	6,139,711,044	1,813,214	(37,406,553)	6,104,117,705	-0.58%	0.03%
Retirement Health Care Trust	3,338,766,813	485,236	(7,007,591)	3,332,244,458	-0.20%	0.01%
Total Defined Benefit Plans	<u>9,478,477,857</u>	<u>2,298,450</u>	<u>(44,414,144)</u>	<u>9,436,362,163</u>	-0.44%	0.02%
<u>Defined Contribution Plans:</u>						
Participant Directed Retirement	709,460,277	(1,556,674)	3,358,959	711,262,562	0.25%	-0.22%
Health Reimbursement Arrangement	169,423,569	7,178	952,778	170,383,525	0.57%	0.00%
Retiree Medical Plan	56,740,255	2,678	300,782	57,043,715	0.53%	0.00%
Defined Benefit Occupational Death and Disability	5,628,891	355	24,160	5,653,406	0.44%	0.01%
Total Defined Contribution Plans	<u>941,252,992</u>	<u>(1,546,463)</u>	<u>4,636,679</u>	<u>944,343,208</u>	0.33%	-0.16%
Total TRS	<u>10,419,730,849</u>	<u>751,987</u>	<u>(39,777,465)</u>	<u>10,380,705,371</u>	-0.37%	0.01%
<u>Judicial Retirement System (JRS)</u>						
Defined Benefit Plan Retirement Trust	218,113,796	54,267	(527,485)	217,640,578	-0.22%	0.02%
Defined Benefit Retirement Health Care Trust	38,404,821	4,623	5,928	38,415,372	0.03%	0.01%
Total JRS	<u>256,518,617</u>	<u>58,890</u>	<u>(521,557)</u>	<u>256,055,950</u>	-0.18%	0.02%
<u>National Guard/Naval Militia Retirement System (MRS)</u>						
Defined Benefit Plan Retirement Trust	46,465,317	(62,491)	(86,516)	46,316,310	-0.32%	-0.13%
<u>Other Participant Directed Plans</u>						
Supplemental Annuity Plan	4,744,917,551	(10,612,949)	(10,220,061)	4,724,084,541	-0.44%	-0.22%
Deferred Compensation Plan	1,134,936,156	(2,356,787)	(2,919,666)	1,129,659,703	-0.46%	-0.21%
Total All Funds	<u>38,705,414,072</u>	<u>(11,599,919)</u>	<u>(105,557,081)</u>	<u>38,588,257,072</u>		
Total Non-Participant Directed	30,385,265,614	6,636,796	(104,056,070)	30,287,846,340	-0.32%	0.02%
Total Participant Directed	8,320,148,458	(18,236,715)	(1,501,011)	8,300,410,732	-0.24%	-0.22%
Total All Funds	<u>\$ 38,705,414,072</u>	<u>\$ (11,599,919)</u>	<u>\$ (105,557,081)</u>	<u>\$ 38,588,257,072</u>	-0.30%	-0.03%

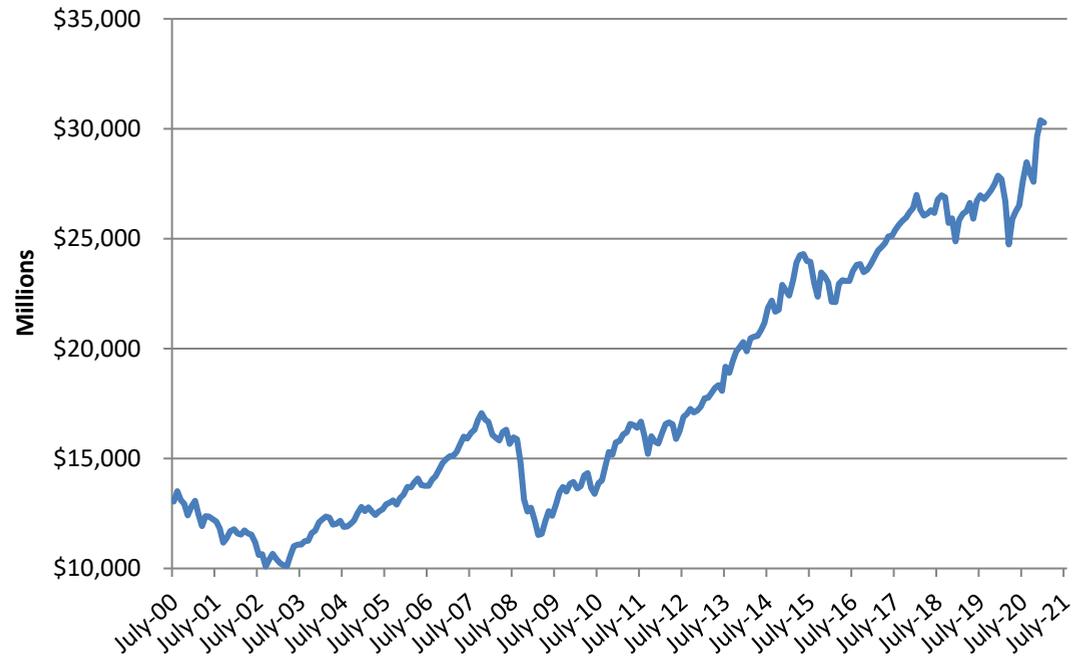
Notes:

(1) Includes interest, dividends, securities lending, expenses, realized and unrealized gains/losses

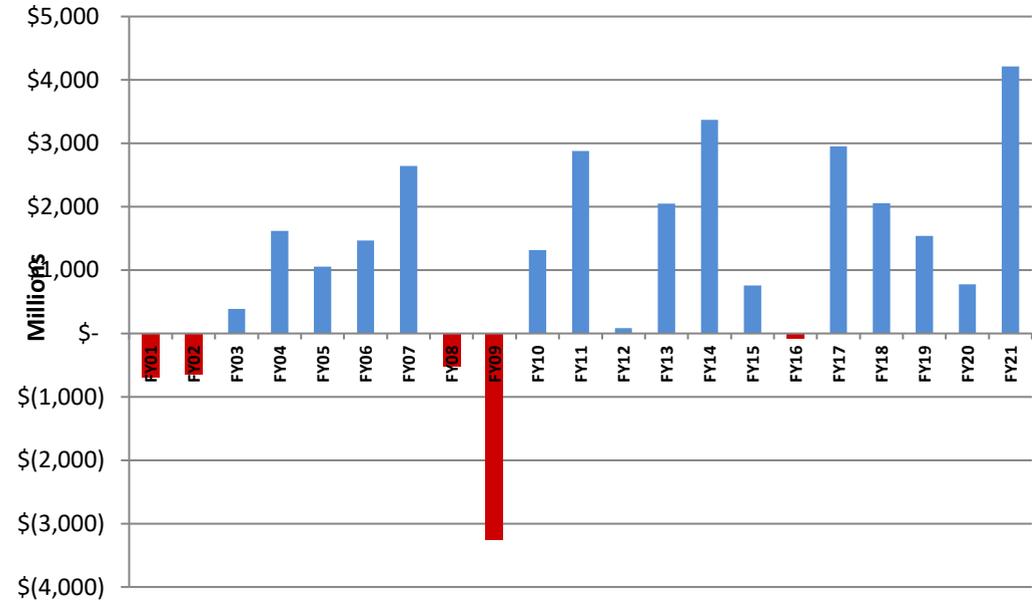
(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: <http://treasury.dor.alaska.gov/armb/Reports-and-Policies/Investment-Performance.aspx>

Total Non Participant Directed Assets As of January 31, 2021

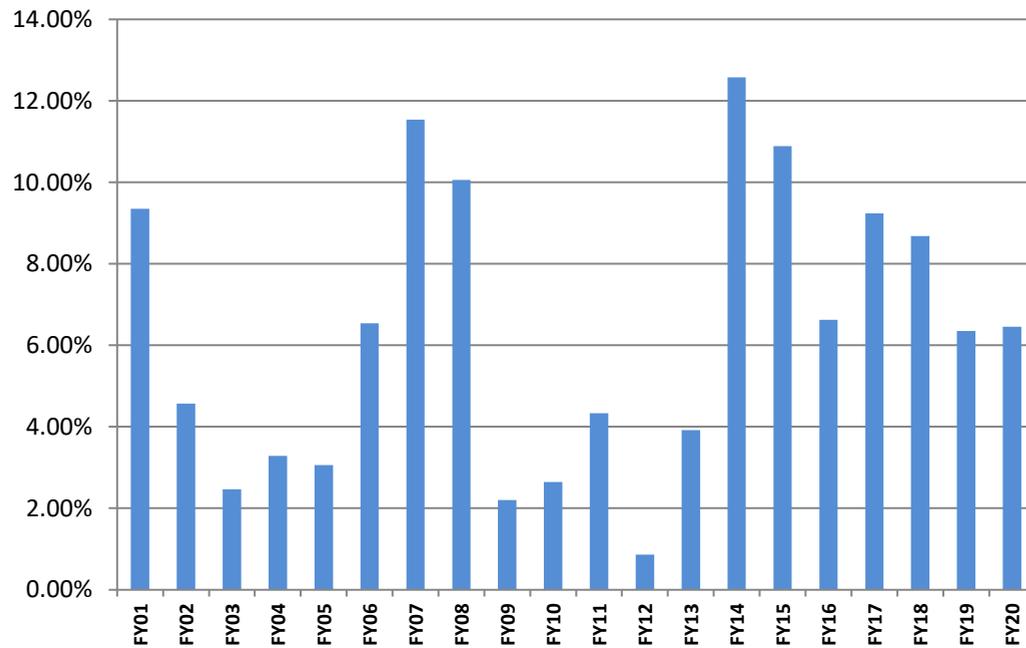
Total Assets History



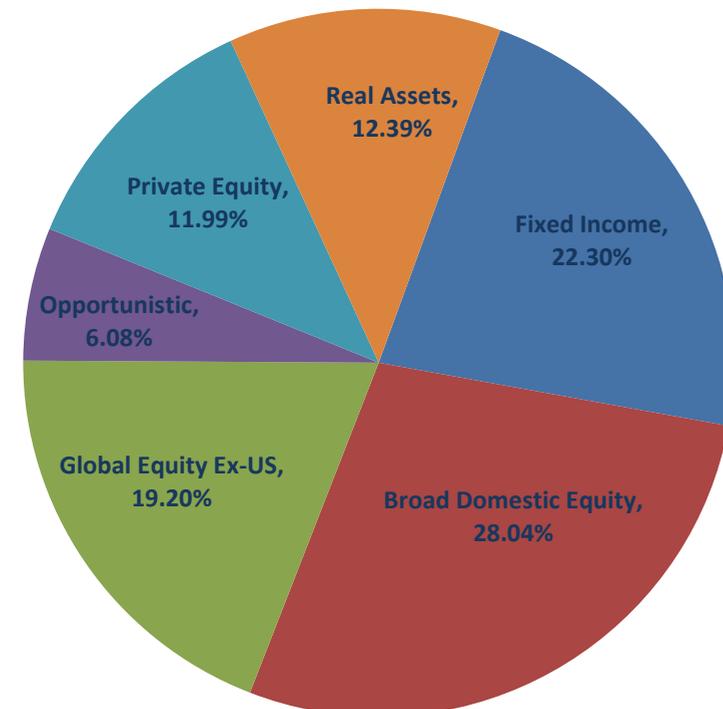
Income by Fiscal Year



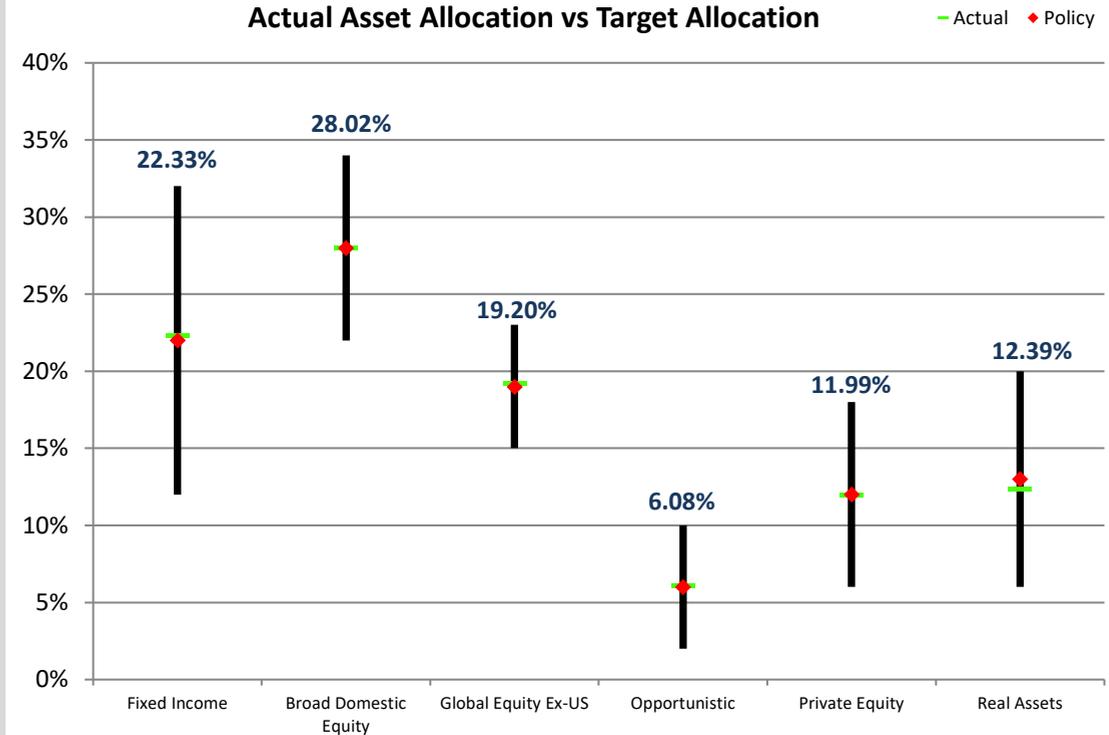
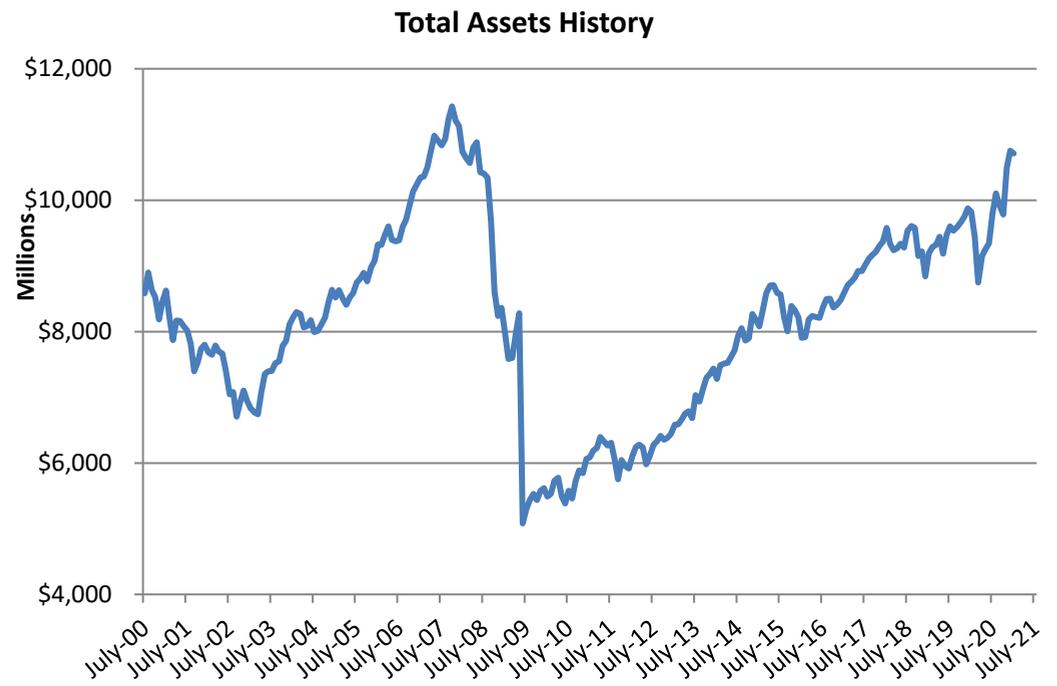
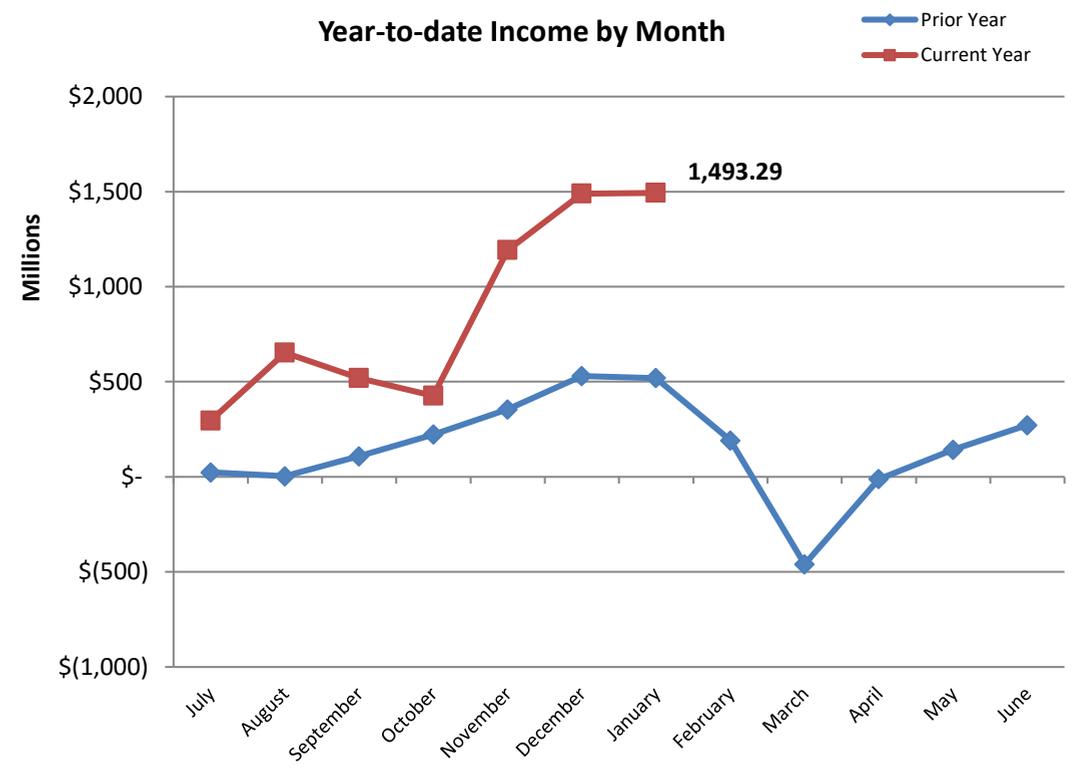
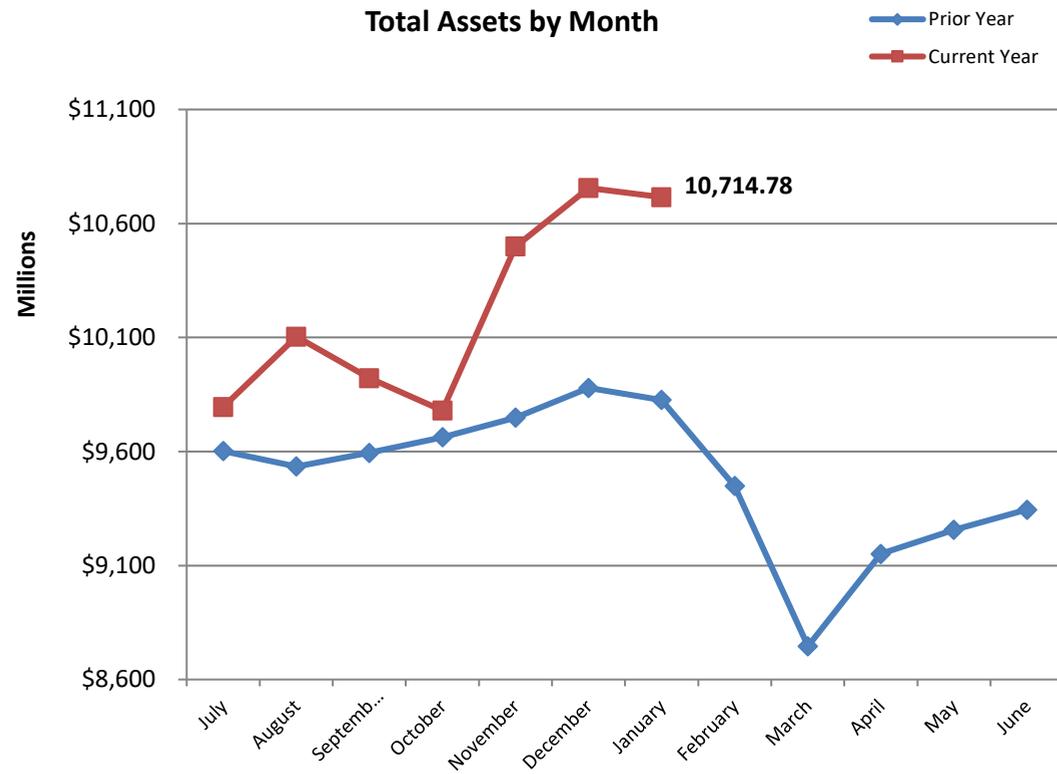
5-year Annualized Returns as of Fiscal Year End



Actual Asset Allocation

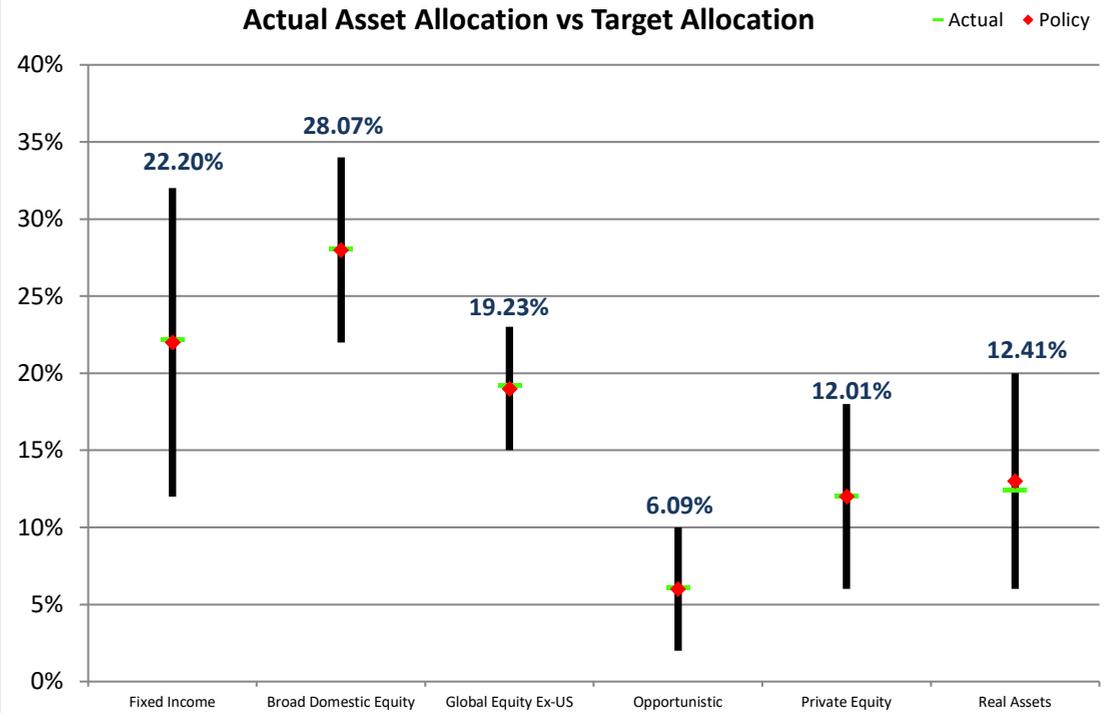
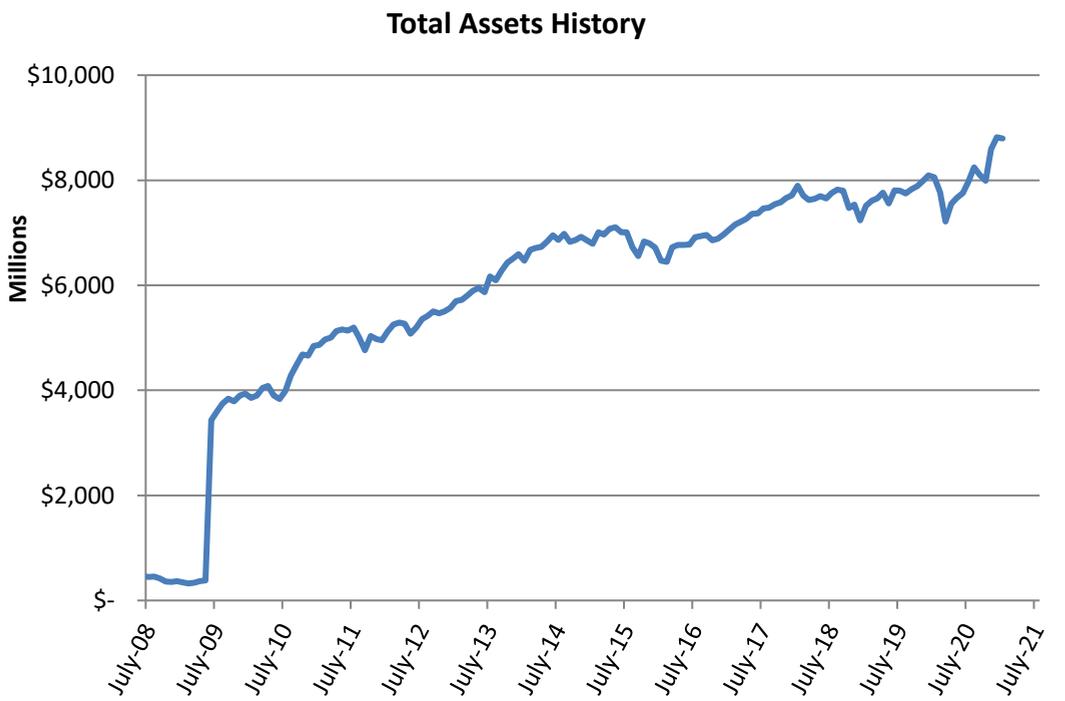
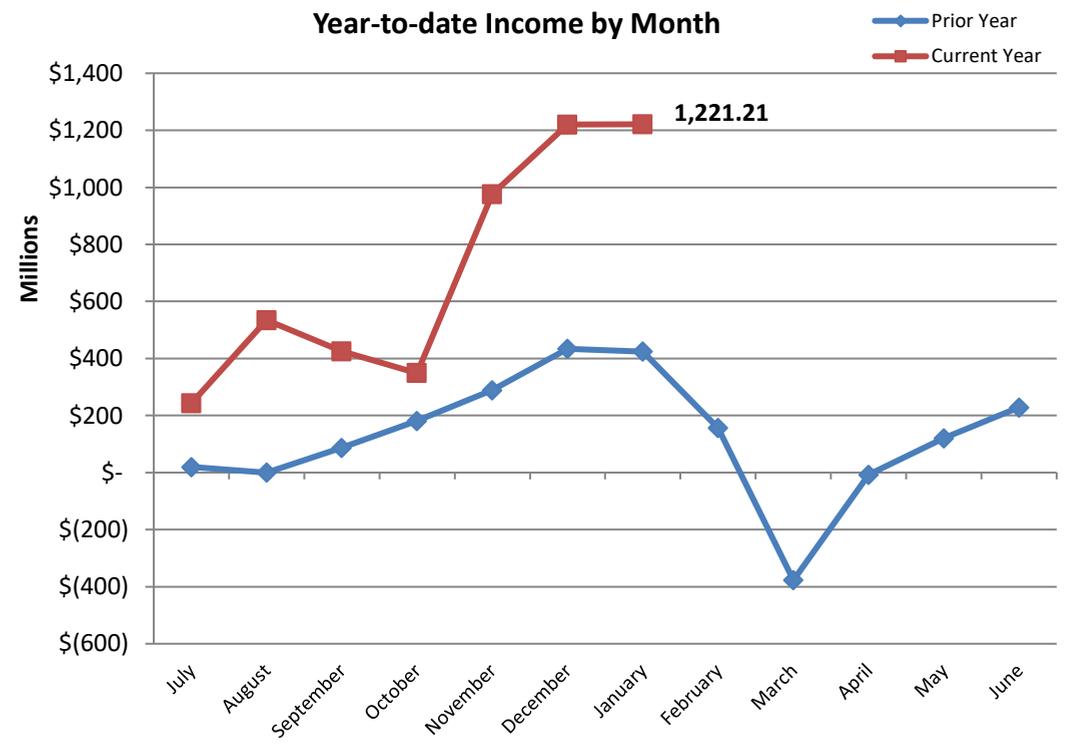
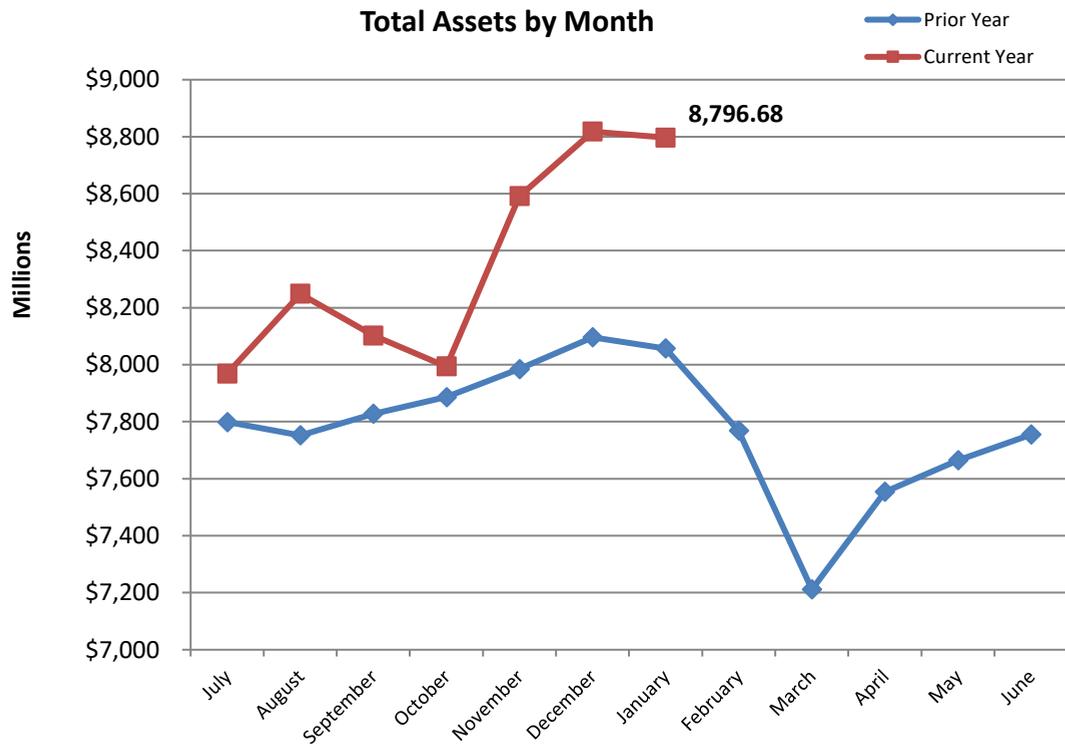


Public Employees' Retirement Pension Trust Fund Fiscal Year-to-Date through January 31, 2021

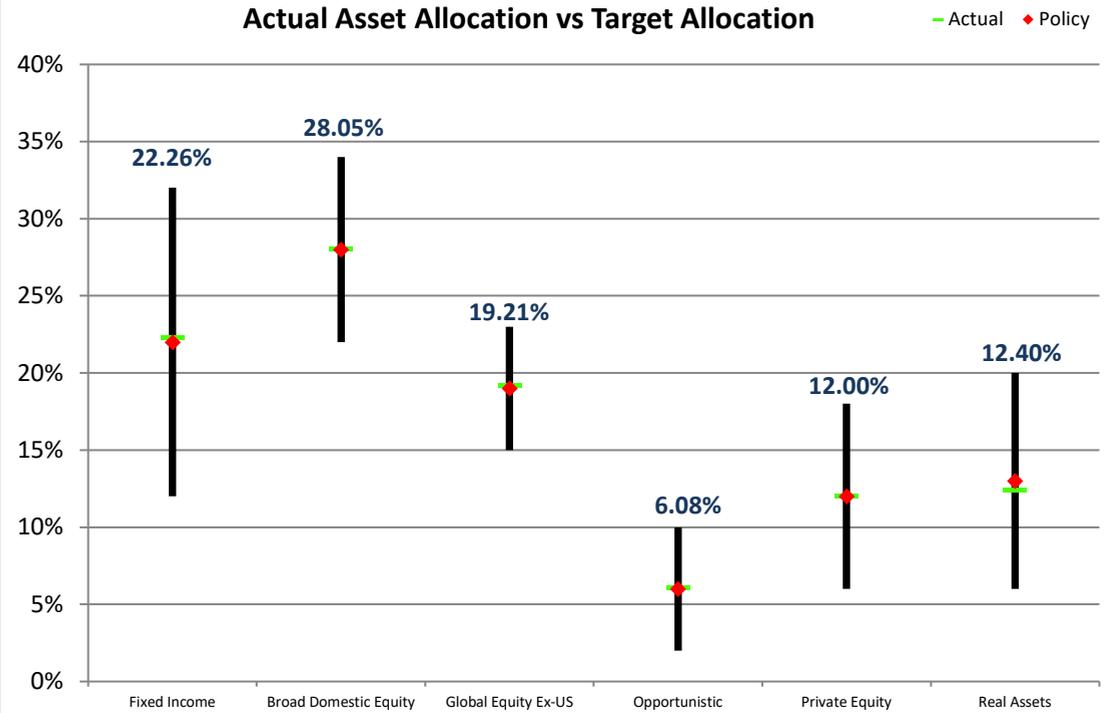
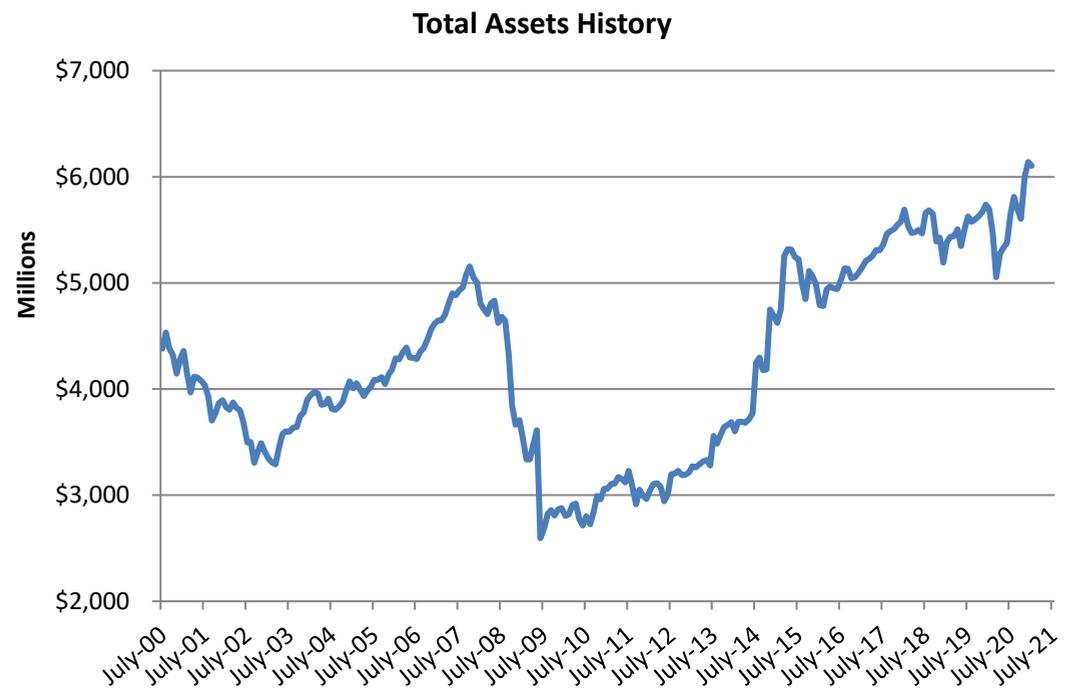
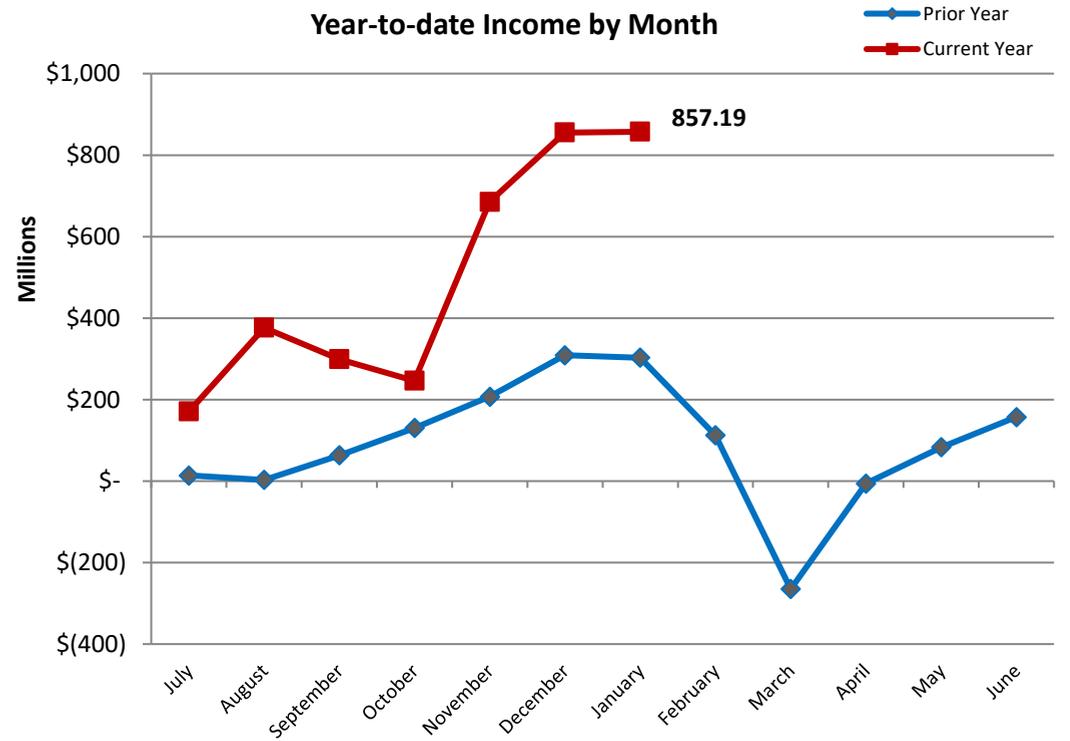
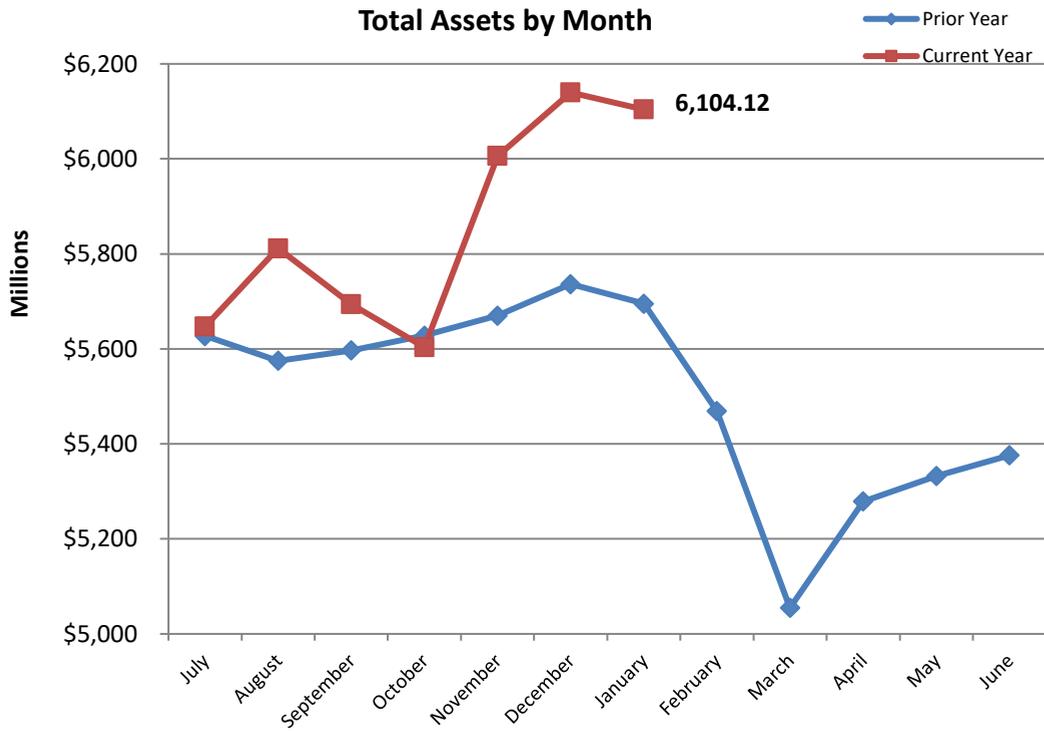


Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through January 31, 2021

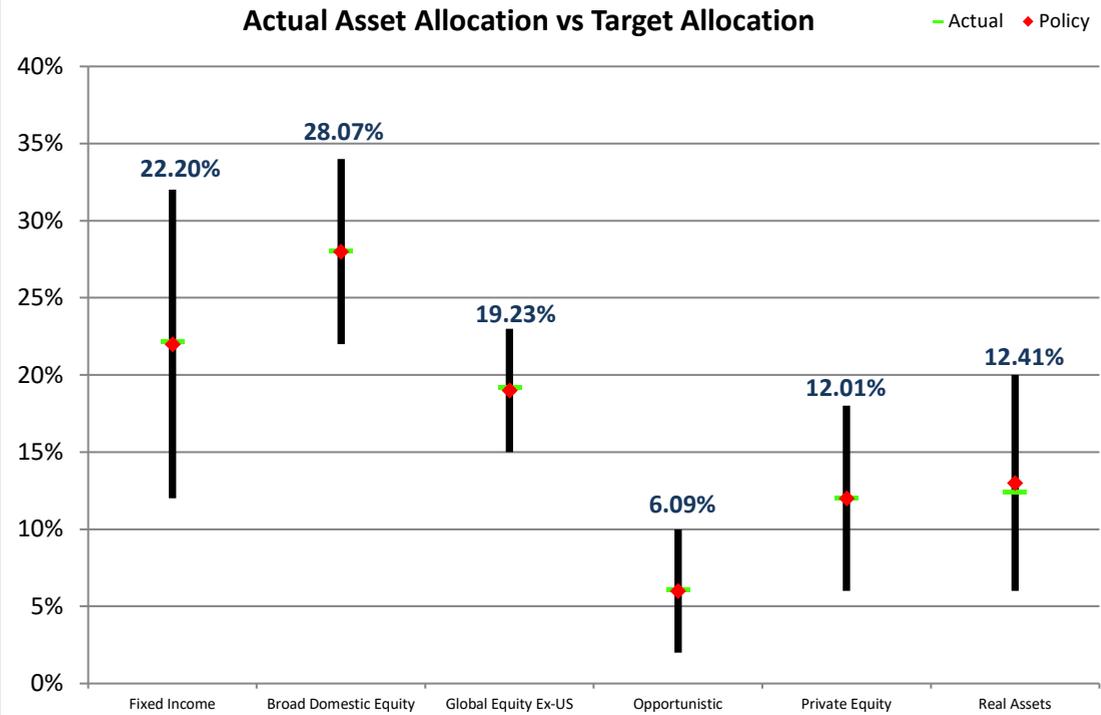
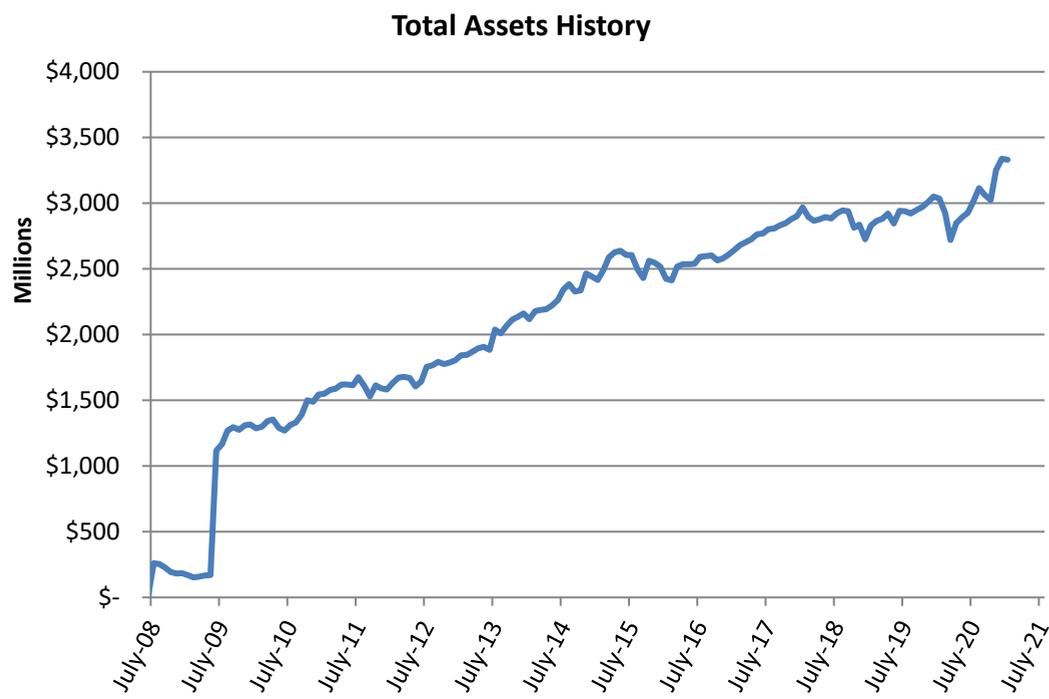
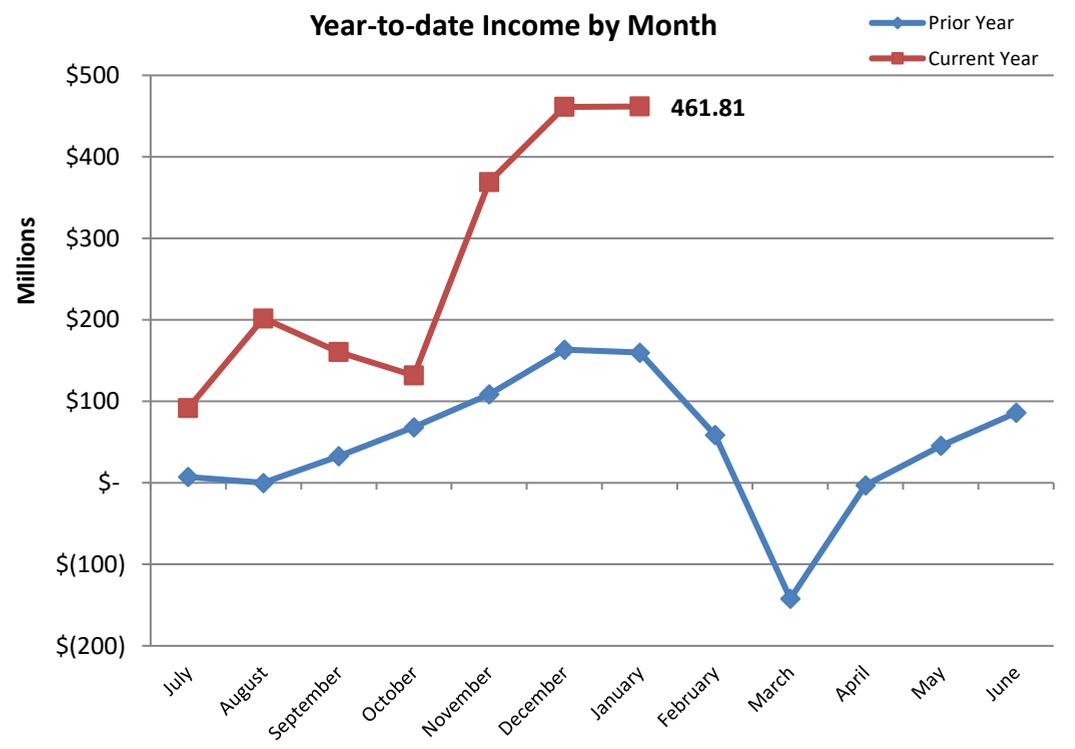
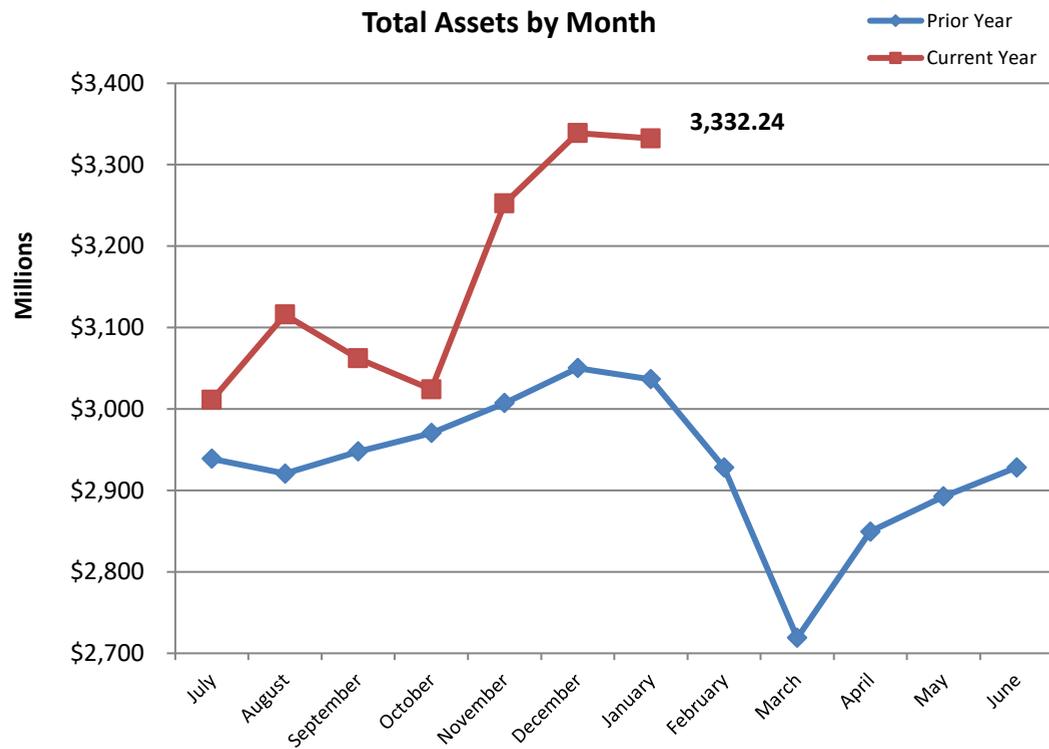


Teachers' Retirement Pension Trust Fund Fiscal Year-to-Date through January 31, 2021



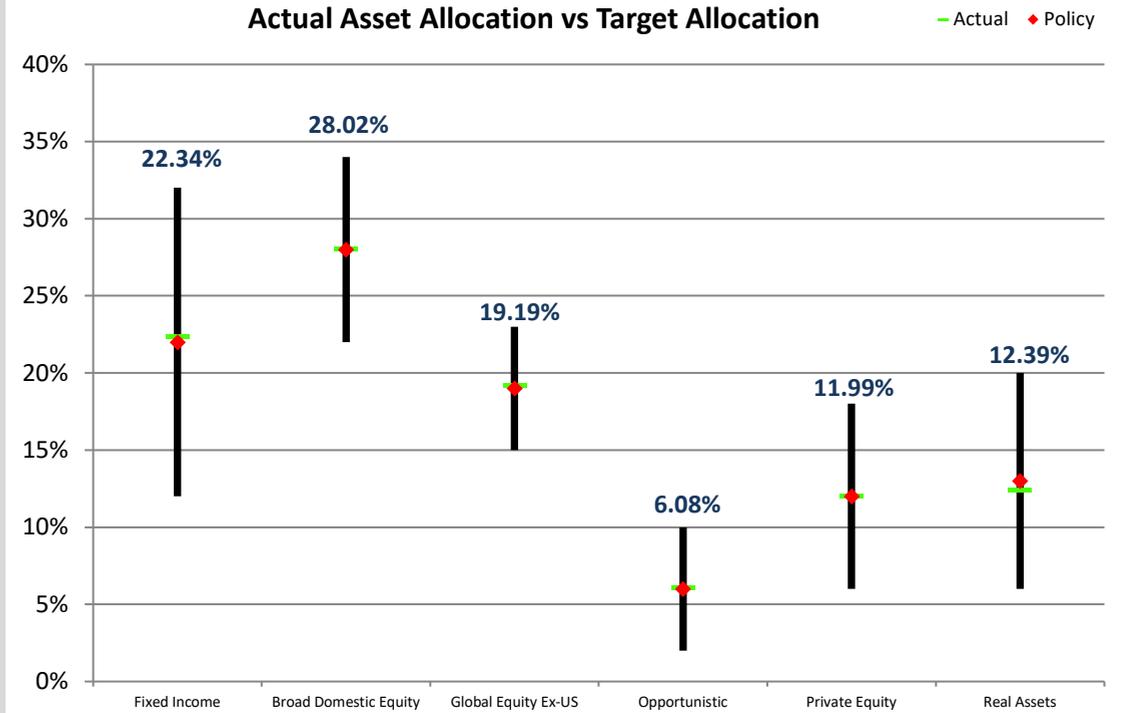
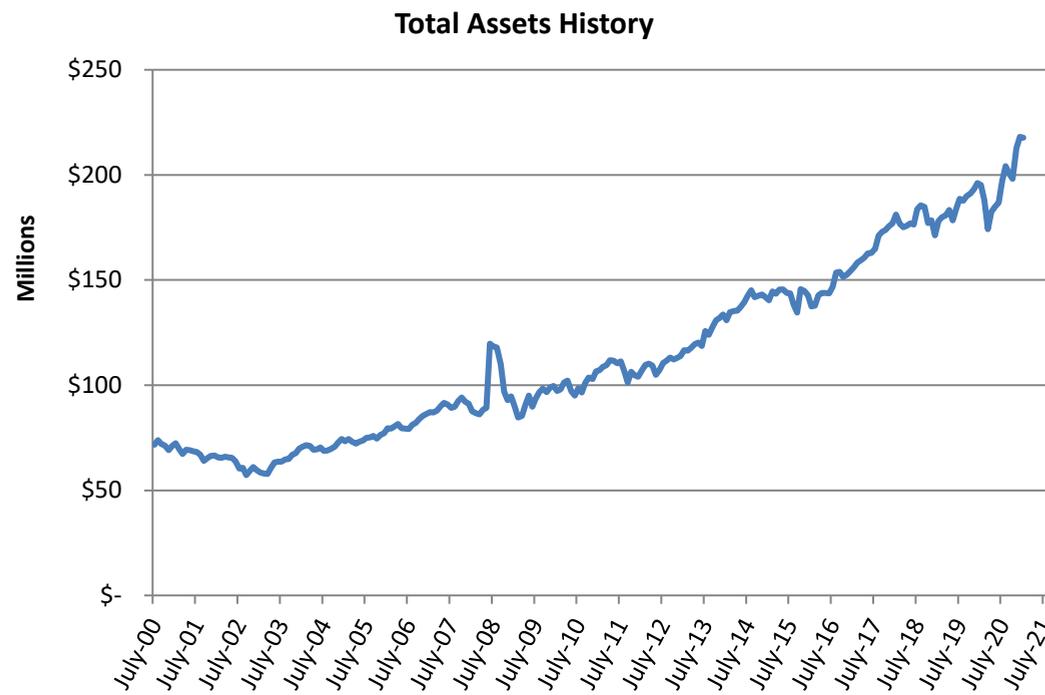
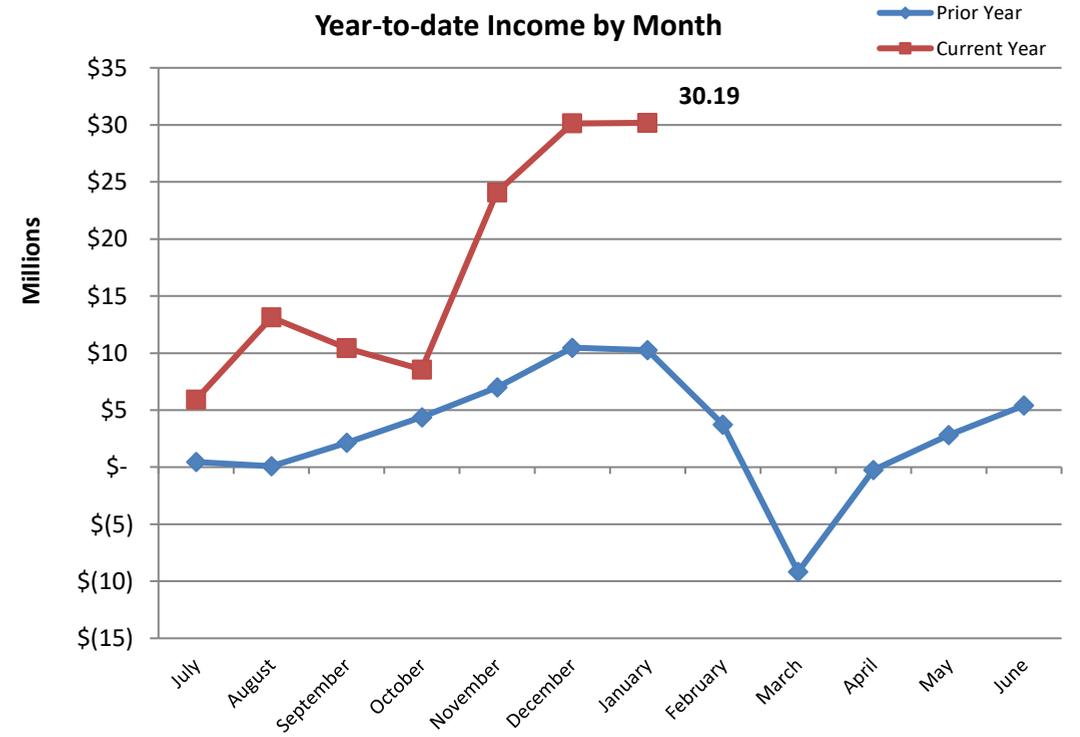
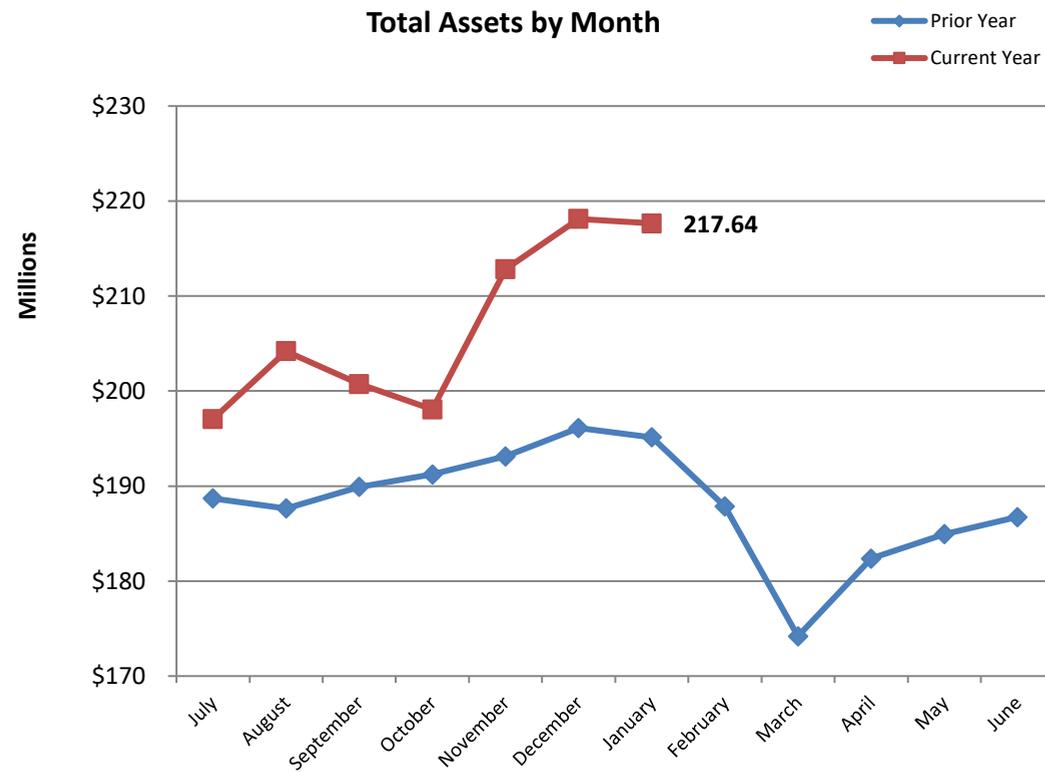
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through January 31, 2021



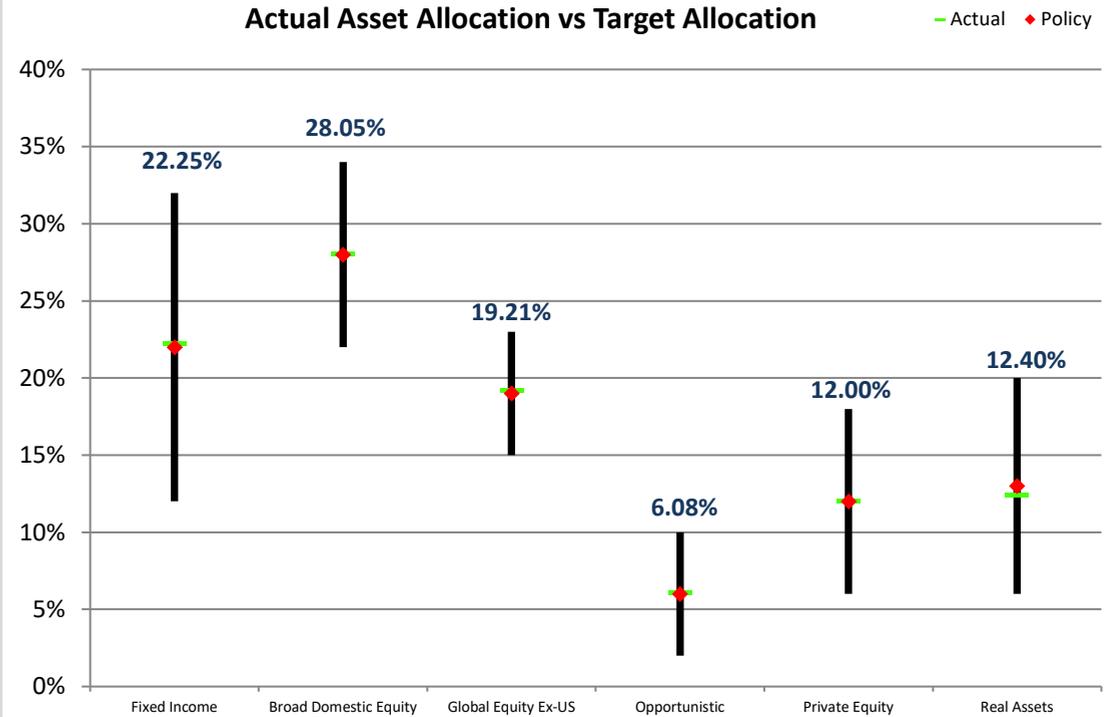
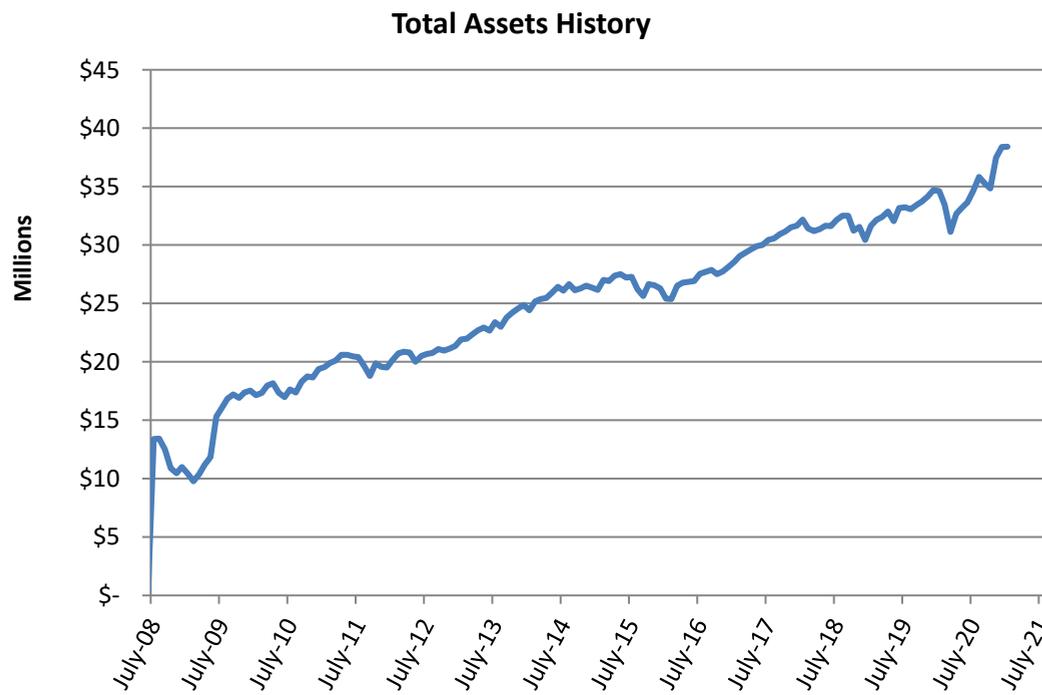
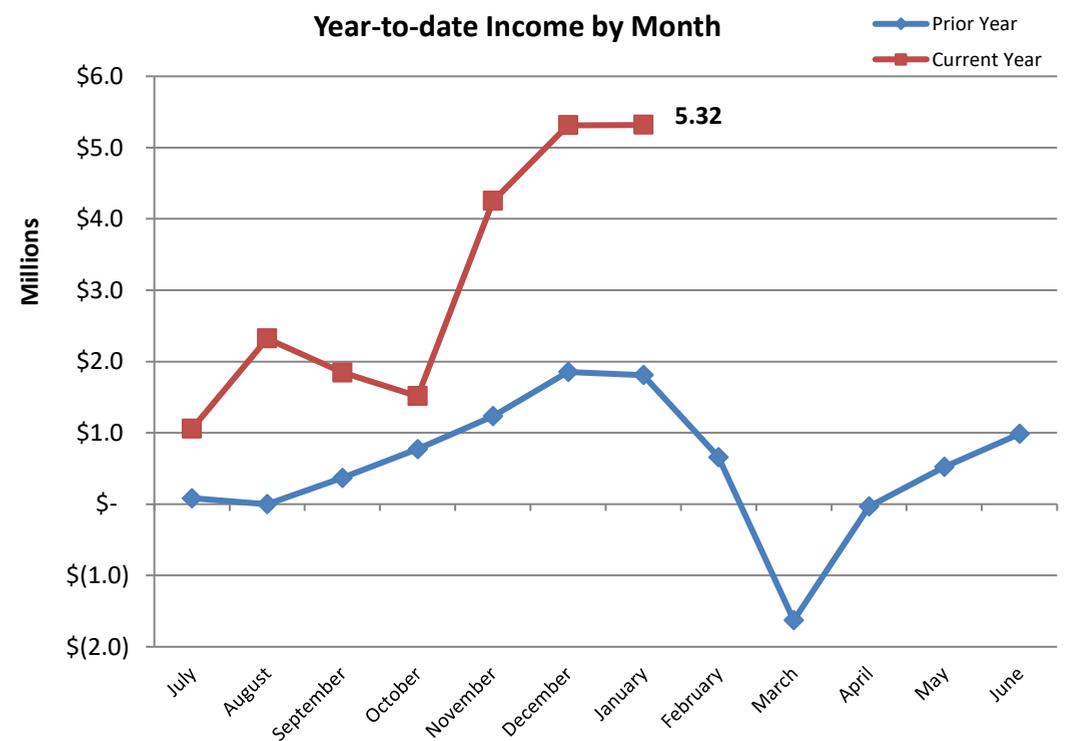
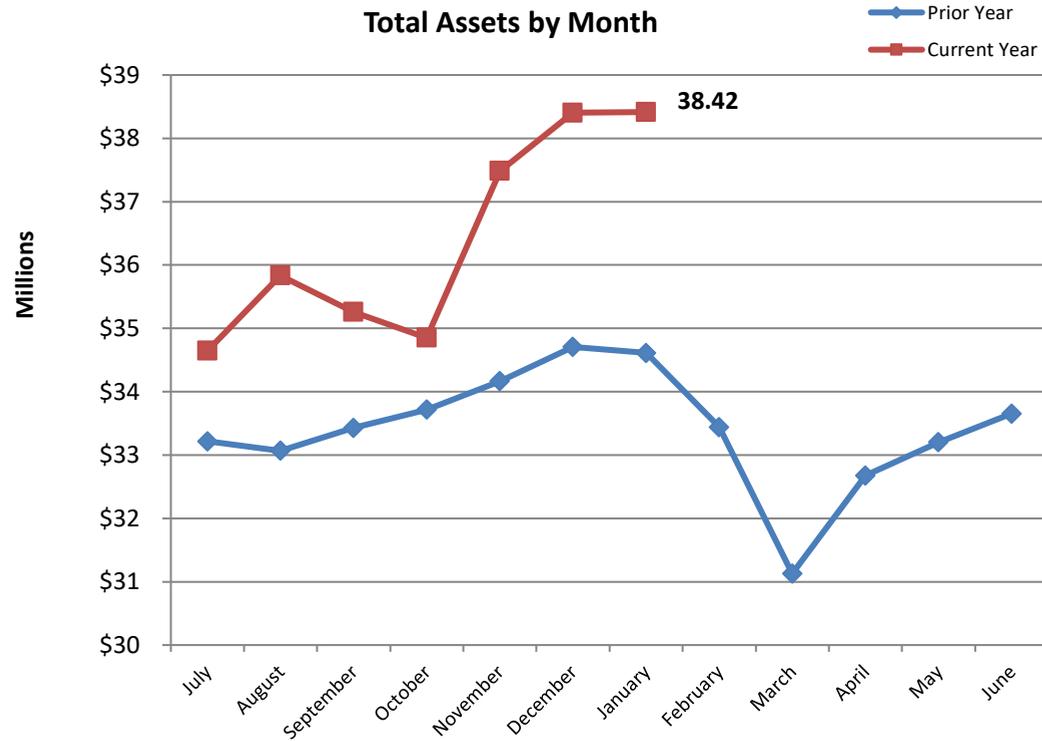
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through January 31, 2021

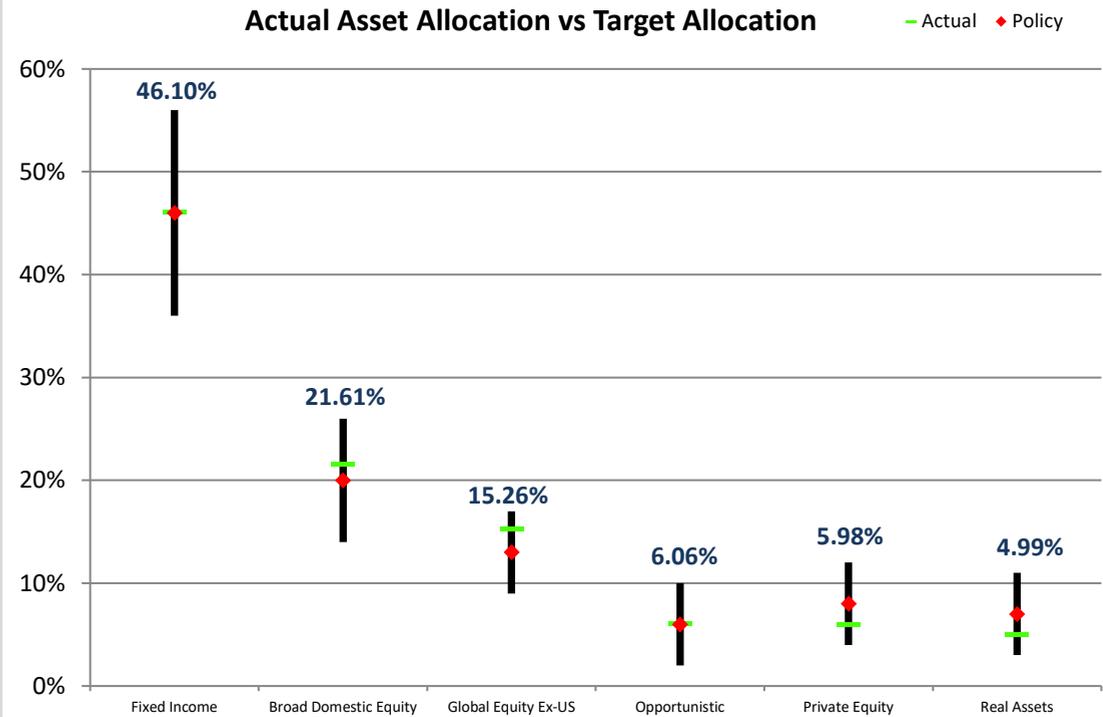
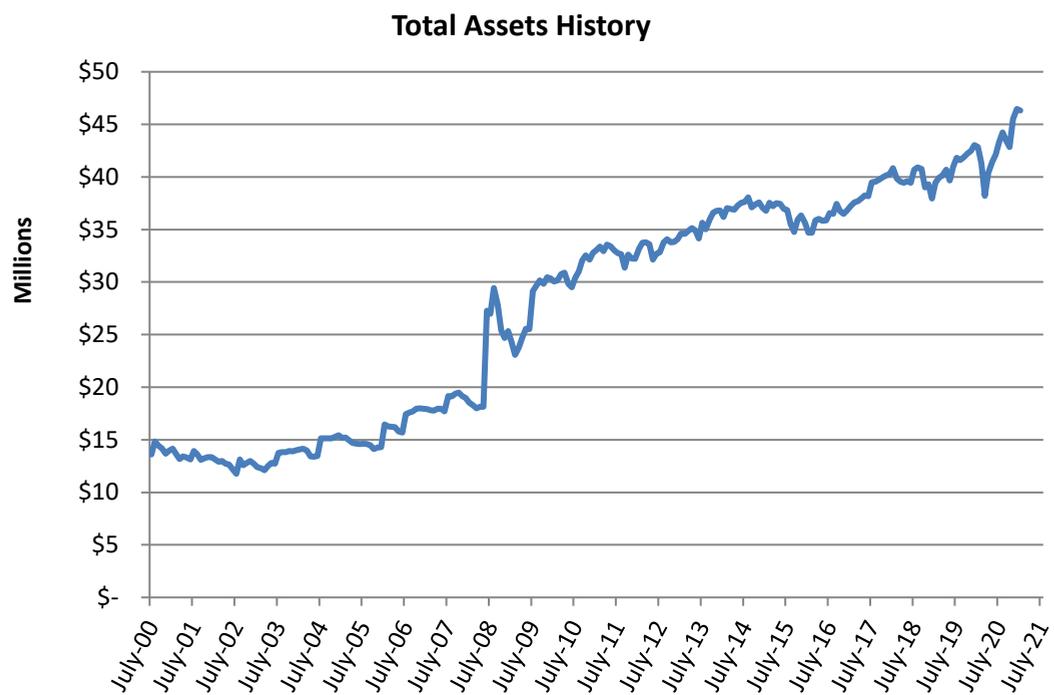
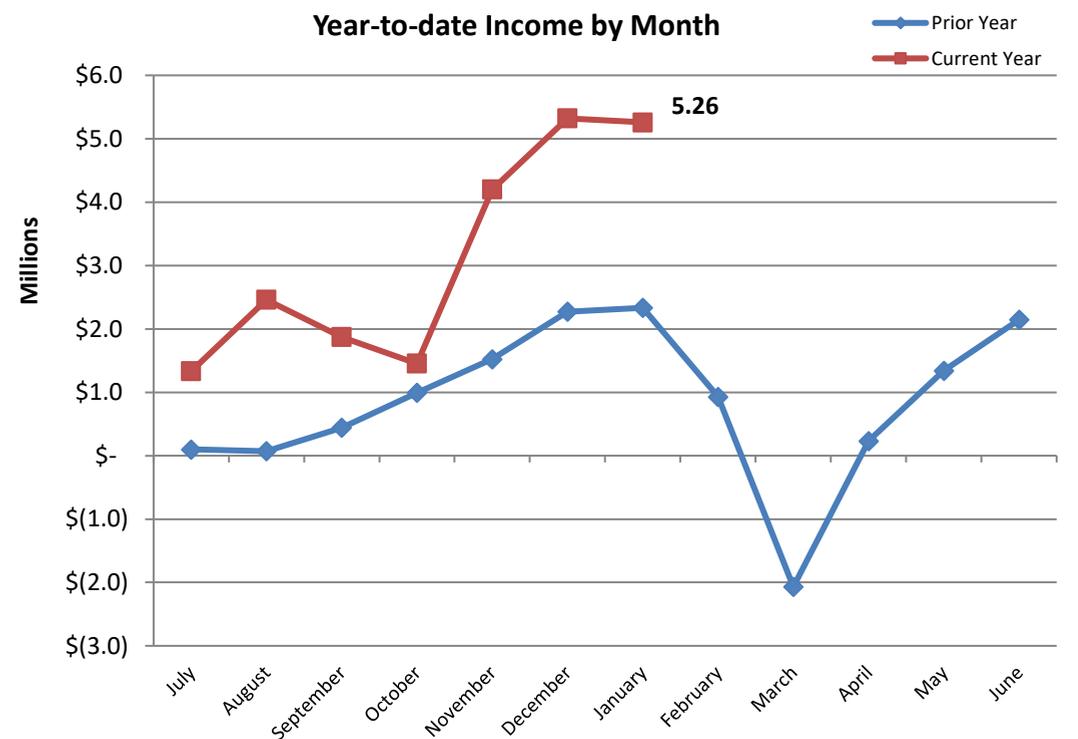
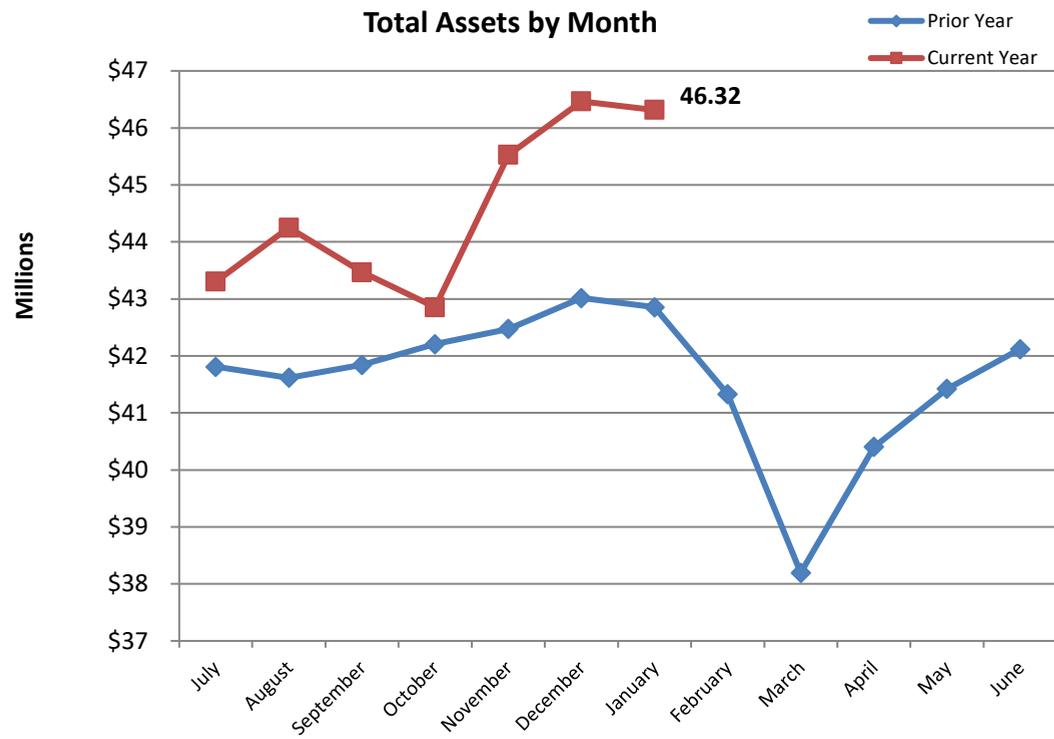


Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through January 31, 2021



Military Retirement Trust Fund Fiscal Year-to-Date through January 31, 2021



ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

All Non-Participant Directed Plans

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2021

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)	% Change due to Investment Income
Cash						
Short-Term Fixed Income Pool	\$ 355,024,445	\$ 85,927	\$ (38,060,939)	\$ 317,049,433	-10.70%	0.03%
Securities Lending Income Pool	60,276	89,672	(63,397)	86,551	43.59%	313.79%
Total Cash	<u>355,084,721</u>	<u>175,599</u>	<u>(38,124,336)</u>	<u>317,135,984</u>	-10.69%	0.05%
Fixed Income						
Alternative Fixed Income						
Crestline Investors, Inc.	594,881,164	6,591,739	2,450,598	603,923,501	1.52%	1.11%
Prisma Capital Partners	92,743,919	458,669	(4,000,000)	89,202,588	-3.82%	0.51%
Crestline Specialty Fund	9,883,879	1	(1,310,937)	8,572,943	-13.26%	0.00%
Crestline Specialty Lending Fund II	37,545,884	-	-	37,545,884	-	-
Total Alternative Fixed Income	<u>735,054,846</u>	<u>7,050,409</u>	<u>(2,860,339)</u>	<u>739,244,916</u>	0.57%	0.96%
Opportunistic Fixed Income						
Fidelity Inst. Asset Mgmt. High Yield CMBS	203,722,077	5,758,357	-	209,480,434	2.83%	2.83%
Fidelity Institutional Asset Management	734,831,819	(4,962,043)	250,000,000	979,869,776	33.35%	-0.58%
MacKay Shields, LLC	3,425,788	(65,440)	-	3,360,348	-1.91%	-1.91%
Total Opportunistic Fixed Income	<u>941,979,684</u>	<u>730,874</u>	<u>250,000,000</u>	<u>1,192,710,558</u>	26.62%	0.07%
ARMB Barclays Agg Bond Fund	4,420,648,305	(40,600,004)	125,500,000	4,505,548,301	1.92%	-0.91%
Total Fixed Income	<u>6,097,682,835</u>	<u>(32,818,721)</u>	<u>372,639,661</u>	<u>6,437,503,775</u>	5.57%	-0.52%
Domestic Equities						
Small Cap						
Passively Managed						
ARMB S&P 600	737,810,312	42,737,515	(57,991,022)	722,556,805	-2.07%	6.03%
Total Passive	<u>737,810,312</u>	<u>42,737,515</u>	<u>(57,991,022)</u>	<u>722,556,805</u>	-2.07%	6.03%
Actively Managed						
Transition Account	-	-	-	-	-	-
Total Active	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	-	-
Total Small Cap	<u>737,810,312</u>	<u>42,737,515</u>	<u>(57,991,022)</u>	<u>722,556,805</u>	-2.07%	6.03%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2021

Large Cap							
Passively Managed							
ARMB S&P 900	5,566,505,485	(46,925,744)	(81,932,987)	5,437,646,754	-2.31%	-0.85%	
Total Passive	<u>5,566,505,485</u>	<u>(46,925,744)</u>	<u>(81,932,987)</u>	<u>5,437,646,754</u>	-2.31%	-0.85%	
Actively Managed							
ARMB Domestic Residual Assets	8,639	133,317	-	141,956	1543.20%	1543.20%	
ARMB Large Cap Multi-Factor	235,364,483	(1,421,924)	-	233,942,559	-0.60%	-0.60%	
ARMB Scientific Beta	2,105,924,562	(8,987,928)	131,746	2,097,068,380	-0.42%	-0.43%	
Transition Account	1	-	-	1	-	-	
Total Active	<u>2,341,297,685</u>	<u>(10,276,535)</u>	<u>131,746</u>	<u>2,331,152,896</u>	-0.43%	-0.44%	
Total Large Cap	<u>7,907,803,170</u>	<u>(57,202,279)</u>	<u>(81,801,241)</u>	<u>7,768,799,650</u>	-1.76%	-0.73%	
Total Domestic Equity	<u>8,645,613,482</u>	<u>(14,464,764)</u>	<u>(139,792,263)</u>	<u>8,491,356,455</u>	-1.78%	-0.17%	
Large Cap							
Arrow Street Capital	646,539,183	3,543,779	-	650,082,962	0.55%	0.55%	
Baillie Gifford Overseas Limited	316,422,721	2,131,065	(33,000,000)	285,553,786	-9.76%	0.71%	
Brandes Investment Partners	328,409,554	(784,798)	(42,752,475)	284,872,281	-13.26%	-0.26%	
Cap Guardian Trust Co	612,542,166	3,618,241	(38,000,000)	578,160,407	-5.61%	0.61%	
Legal & General	855,968,476	(1,286,705)	52,152	854,733,923	-0.14%	-0.15%	
McKinley Capital Management	2,840,733	(16,441)	-	2,824,292	-0.58%	-0.58%	
SSgA MSCI World Ex-US IMI Index Fund	2,185,659,914	(20,416,957)	(40,427,879)	2,124,815,078	-2.78%	-0.94%	
State Street Global Advisors	201,600	-	-	201,600	-	-	
Total Large Cap	<u>4,948,584,347</u>	<u>(13,211,816)</u>	<u>(154,128,202)</u>	<u>4,781,244,329</u>	-3.38%	-0.27%	

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2021

Emerging Markets Equity							
MSCI Emerging Markets Index Fund	769,501,169	22,079,592	(53,968,075)	737,612,686	-4.14%	2.97%	
DePrince, Race, and Zollo Emerging Markets	72,916	-	-	72,916	-	-	
Legal & General Sci-Beta Emerging Markets	315,572,454	9,115,942	(26,981,711)	297,706,685	-5.66%	3.02%	
Total Emerging Markets	1,085,146,539	31,195,534	(80,949,786)	1,035,392,287	-4.59%	2.99%	
Total Global Equities	6,033,730,886	17,983,718	(235,077,988)	5,816,636,616	-3.60%	0.30%	
Opportunistic							
Alternative Equity Strategy							
Alternative Equity Strategies Transition Account	-	-	-	-	-	-	
McKinley Global Health Care	355,853,037	9,046,405	408,095	365,307,537	2.66%	2.54%	
Total Alternative Equity Strategy	355,853,037	9,046,405	408,095	365,307,537	2.66%	2.54%	
Alternative Beta							
Man Group Alternative Risk Premia	285,435,904	8,265,316	-	293,701,220	2.90%	2.90%	
Total Alternative Beta	285,435,904	8,265,316	-	293,701,220	2.90%	2.90%	
Other Opportunities							
Project Pearl	9,482,174	(63,288)	-	9,418,886	-0.67%	-0.67%	
Schroders Insurance Linked Securities	19,048,488	(407,705)	-	18,640,783	-2.14%	-2.14%	
Total Other Opportunities	28,530,662	(470,993)	-	28,059,669	-1.65%	-1.65%	
Tactical Allocation Strategies							
Fidelity Signals	582,216,055	(2,487,763)	-	579,728,292	-0.43%	-0.43%	
PineBridge	580,761,687	(5,143,936)	-	575,617,751	-0.89%	-0.89%	
Total Tactical Allocation Strategies	1,162,977,742	(7,631,699)	-	1,155,346,043	-0.66%	-0.66%	
Total Opportunistic	1,832,797,345	9,209,029	408,095	1,842,414,469	0.52%	0.50%	

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2021

Private Equity

Abbott Capital	1,413,662,455	5,834,742	(25,736,757)	1,393,760,440	-1.41%	0.42%
Advent International GPE Fund VIII-B	36,592,867	-	-	36,592,867	-	-
Advent International GPE Fund IX	13,258,004	-	-	13,258,004	-	-
Angelo, Gordon & Co.	5,599	-	-	5,599	-	-
Clearlake Capital Partners VI	7,906,801	-	3,966,937	11,873,738	50.17%	-
Dyal Capital Partners III	30,436,429	-	-	30,436,429	-	-
Dyal Capital Partners IV	10,729,143	933,737	-	11,662,880	8.70%	8.70%
Glendon Opportunities	25,349,872	-	(3,601,057)	21,748,815	-14.21%	-
Glendon Opportunities II	37,239,285	-	-	37,239,285	-	-
KKR Lending Partners II	16,536,070	-	-	16,536,070	-	-
Lexington Capital Partners VIII	31,566,748	-	-	31,566,748	-	-
Lexington Partners VII	13,791,290	-	-	13,791,290	-	-
Merit Capital Partners	10,075,098	(1)	(135,784)	9,939,313	-1.35%	0.00%
NB SOF III	16,536,848	-	-	16,536,848	-	-
NB SOF IV	27,294,650	-	-	27,294,650	-	-
New Mountain Partners IV	22,912,063	-	(3,797,547)	19,114,516	-16.57%	-
New Mountain Partners V	47,351,212	-	76,077	47,427,289	0.16%	-
NGP XI	32,169,188	-	-	32,169,188	-	-
NGP XII	20,126,174	-	-	20,126,174	-	-
Onex Partnership III	6,682,735	-	-	6,682,735	-	-
Pathway Capital Management LLC	1,597,666,453	(3,363,621)	(4,876,880)	1,589,425,952	-0.52%	-0.21%
Resolute Fund III	8,910,810	-	(54,230)	8,856,580	-0.61%	-
Resolute Fund IV	50,239,520	-	(13,423)	50,226,097	-0.03%	-
Summit Partners GE IX	55,622,291	-	(183,804)	55,438,487	-0.33%	-
Summit Partners GE X	17,339,395	-	-	17,339,395	-	-
Warburg Pincus Global Growth Fund	17,937,329	-	-	17,937,329	-	-
Warburg Pincus X	3,011,547	-	(233,820)	2,777,727	-7.76%	-
Warburg Pincus XI	16,574,329	-	(405,000)	16,169,329	-2.44%	-
Warburg Pincus XII	75,160,089	-	-	75,160,089	-	-
Total Private Equity	3,662,684,294	3,404,857	(34,995,288)	3,631,093,863	-0.86%	0.09%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2021

Real Assets

Farmland

Hancock Agricultural Investment Group	288,412,199	2,465,502	(290,877,701)	-	-100.00%	1.72%
UBS Agrivest, LLC	579,087,412	-	290,877,701	869,965,113	50.23%	-
Total Farmland	<u>867,499,611</u>	<u>2,465,502</u>	<u>-</u>	<u>869,965,113</u>	<u>0.28%</u>	<u>0.28%</u>

Timber

Timberland Invt Resource LLC	358,752,329	-	-	358,752,329	-	-
Total Timber	<u>358,752,329</u>	<u>-</u>	<u>-</u>	<u>358,752,329</u>	<u>-</u>	<u>-</u>

Energy

EIG Energy Fund XIV-A	4,564,172	120,732	-	4,684,904	2.65%	2.65%
EIG Energy Fund XV	9,382,596	(297,873)	-	9,084,723	-3.17%	-3.17%
EIG Energy Fund XVI	46,846,882	(810,087)	-	46,036,795	-1.73%	-1.73%
Total Energy	<u>60,793,650</u>	<u>(987,228)</u>	<u>-</u>	<u>59,806,422</u>	<u>-1.62%</u>	<u>-1.62%</u>

REIT

REIT Transition Account	-	-	-	-	-	-
ARMB REIT	329,448,765	331,827	-	329,780,592	0.10%	0.10%
Total REIT	<u>329,448,765</u>	<u>331,827</u>	<u>-</u>	<u>329,780,592</u>	<u>0.10%</u>	<u>0.10%</u>

Infrastructure Private

IFM Global Infrastructure Fund-Private	549,879,321	18,382,379	(5,652,789)	562,608,911	2.31%	3.36%
JP Morgan Infrastructure Fund-Private	130,073,021	-	-	130,073,021	-	-
Total Infrastructure Private	<u>679,952,342</u>	<u>18,382,379</u>	<u>(5,652,789)</u>	<u>692,681,932</u>	<u>1.87%</u>	<u>2.71%</u>

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended January 31, 2021

Real Estate							
Core Commingled Accounts							
BlackRock US Core Property Fund	325,775,755	2,747,034	-	328,522,789	0.84%	0.84%	
JP Morgan	173,549,964	1,212,746	(21,022,192)	153,740,518	-11.41%	0.74%	
UBS Trumbull Property Fund	47,675,302	(1,005,182)	(1,173,444)	45,496,676	-4.57%	-2.13%	
Total Core Commingled	<u>547,001,021</u>	<u>2,954,598</u>	<u>(22,195,636)</u>	<u>527,759,983</u>	-3.52%	0.55%	
Core Separate Accounts							
UBS Realty	293,881	-	-	293,881	-	-	
Sentinel Separate Account	174,139,136	-	(722,739)	173,416,397	-0.42%	-	
UBS Realty	640,618,985	-	(542,787)	640,076,198	-0.08%	-	
Total Core Separate	<u>815,052,002</u>	<u>-</u>	<u>(1,265,526)</u>	<u>813,786,476</u>	-0.16%	-	
Non-Core Commingled Accounts							
Almanac Realty Securities V	73,349	-	-	73,349	-	-	
Almanac Realty Securities VII	24,352,493	-	-	24,352,493	-	-	
Almanac Realty Securities VIII	9,521,523	-	-	9,521,523	-	-	
Clarion Ventures 4	31,982,532	-	-	31,982,532	-	-	
Colony Investors VIII, L.P.	1,133,905	-	-	1,133,905	-	-	
Coventry	31,259	-	-	31,259	-	-	
ING Clarion Development Ventures III	1,132,261	-	-	1,132,261	-	-	
KKR Real Estate Partners Americas II	18,951,046	-	-	18,951,046	-	-	
KKR Real Estate Partners Americas L.P.	5,789,996	-	-	5,789,996	-	-	
Silverpeak Legacy Pension Partners II, L.P.	1,101,406	-	-	1,101,406	-	-	
Silverpeak Legacy Pension Partners III, L.P.	2,700,839	-	-	2,700,839	-	-	
Tishman Speyer Real Estate Venture VI	1,977,531	-	-	1,977,531	-	-	
Tishman Speyer Real Estate Venture VII	424,191	-	-	424,191	-	-	
Total Non-Core Commingled	<u>99,172,331</u>	<u>-</u>	<u>-</u>	<u>99,172,331</u>	-	-	
Total Real Estate	<u>1,461,225,354</u>	<u>2,954,598</u>	<u>(23,461,162)</u>	<u>1,440,718,790</u>	-1.40%	0.20%	
Total Real Assets	<u>3,757,672,051</u>	<u>23,147,078</u>	<u>(29,113,951)</u>	<u>3,751,705,178</u>	-0.16%	0.62%	
Total Assets	<u>\$ 30,385,265,614</u>	<u>\$ 6,636,796</u>	<u>\$ (104,056,070)</u>	<u>\$ 30,287,846,340</u>	-0.32%	0.02%	

ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

Participant Directed Plans

Supplemental Annuity Plan
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
January 31, 2021

	<u>Beginning Invested</u> <u>Assets</u>	<u>Investment Income</u>	<u>Net Contributions</u> <u>(Withdrawals)</u>	<u>Transfers In (Out)</u>	<u>Ending Invested</u> <u>Assets</u>	<u>% Change in</u> <u>Invested</u> <u>Assets</u>	<u>% Change due</u> <u>to Investment</u> <u>Income (1)</u>
Participant Options							
T. Rowe Price							
Stable Value Fund	\$ 478,526,848	\$ 821,482	\$ (3,028,785)	\$ 14,863,069	\$ 491,182,614	2.64%	0.17%
Small Cap Stock Fund	242,604,033	2,064,716	(773,306)	(2,304,494)	241,590,949	-0.42%	0.86%
Alaska Balanced Trust	1,173,331,034	(2,282,504)	(3,894,088)	7,430	1,167,161,872	-0.53%	-0.19%
Long Term Balanced Fund	748,049,722	(1,833,932)	(1,538,455)	(2,558,875)	742,118,460	-0.79%	-0.25%
AK Target Date 2010 Trust	11,373,293	(20,160)	(53,143)	3,475	11,303,465	-0.61%	-0.18%
AK Target Date 2015 Trust	82,408,426	(144,354)	(76,111)	(840,749)	81,347,212	-1.29%	-0.18%
AK Target Date 2020 Trust	92,544,801	(212,444)	(311,311)	1,500,834	93,521,880	1.06%	-0.23%
AK Target Date 2025 Trust	107,887,294	(265,184)	(317,954)	(332,026)	106,972,130	-0.85%	-0.25%
AK Target Date 2030 Trust	81,932,041	(244,177)	331,044	654,510	82,673,418	0.90%	-0.30%
AK Target Date 2035 Trust	83,541,183	(235,415)	505,148	(105,153)	83,705,763	0.20%	-0.28%
AK Target Date 2040 Trust	83,550,806	(256,825)	483,287	(386,907)	83,390,361	-0.19%	-0.31%
AK Target Date 2045 Trust	97,126,195	(314,261)	627,126	(273,833)	97,165,227	0.04%	-0.32%
AK Target Date 2050 Trust	107,827,776	(369,162)	727,567	(21,499)	108,164,682	0.31%	-0.34%
AK Target Date 2055 Trust	108,599,301	(356,988)	991,713	(684,344)	108,549,682	-0.05%	-0.33%
AK Target Date 2060 Trust	4,679,056	(30,816)	197,282	401,448	5,246,970	12.14%	-0.62%
AK Target Date 2065 Trust	1,147,488	(4,011)	60,975	(75,290)	1,129,162	-1.60%	-0.35%
Total Investments with T. Rowe Price	<u>3,505,129,297</u>	<u>(3,684,035)</u>	<u>(6,069,011)</u>	<u>9,847,596</u>	<u>3,505,223,847</u>		
State Street Global Advisors							
Money Market	76,673,540	658	(557,628)	(260,417)	75,856,153	-1.07%	0.00%
S&P 500 Stock Index Fund Series A	473,831,060	(4,476,827)	(2,285,790)	(9,250,572)	457,817,871	-3.38%	-0.96%
Russell 3000 Index	139,353,242	(585,880)	(337,828)	(4,871,170)	133,558,364	-4.16%	-0.43%
World Equity Ex-US Index	69,780,332	208,944	(17,495)	(4,558,186)	65,413,595	-6.26%	0.31%
Total Investments with SSgA	<u>759,638,174</u>	<u>(4,853,105)</u>	<u>(3,198,741)</u>	<u>(18,940,345)</u>	<u>732,645,983</u>		
BlackRock							
Passive U.S. Bond Index Fund	204,622,726	(1,471,982)	(545,676)	3,181,655	205,786,723	0.57%	-0.71%
Strategic Completion Fund	33,850,385	95,739	(47,449)	(887,117)	33,011,558	-2.48%	0.29%
Total Investments with BlackRock	<u>238,473,111</u>	<u>(1,376,243)</u>	<u>(593,125)</u>	<u>2,294,538</u>	<u>238,798,281</u>		
Brandes/Baillie Gifford (2)							
AK International Equity Fund	109,017,544	490,260	(112,898)	3,116,189	112,511,095	3.20%	0.44%
Northern Trust							
Environmental, Social, and Governance Fund	132,659,425	(1,189,826)	(246,286)	3,682,022	134,905,335	1.69%	-0.89%
Total All Funds	<u>\$ 4,744,917,551</u>	<u>\$ (10,612,949)</u>	<u>\$ (10,220,061)</u>	<u>\$ -</u>	<u>\$ 4,724,084,541</u>	-0.44%	-0.22%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

(2) This investment is comprised of two funds, Brandes International Equity Fund and Baillie Gifford International Equity Fund.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2021
\$ (Thousands)

<u>Invested Assets (at fair value)</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>	<u>January</u>
Investments with T. Rowe Price							
Stable Value Fund	\$ 465,771	\$ 470,483	\$ 475,886	\$ 482,784	\$ 485,158	\$ 478,527	\$ 491,183
Small Cap Stock Fund	202,262	210,954	203,459	205,569	227,173	242,604	241,591
Alaska Balanced Trust	1,116,968	1,131,790	1,117,738	1,107,843	1,155,853	1,173,331	1,167,162
Long Term Balanced Fund	681,497	700,604	688,771	676,181	728,937	748,050	742,118
AK Target Date 2010 Trust	11,197	11,541	11,457	11,074	11,834	11,373	11,303
AK Target Date 2015 Trust	79,289	80,979	79,608	76,532	81,056	82,408	81,347
AK Target Date 2020 Trust	89,384	91,060	88,056	86,058	91,058	92,545	93,522
AK Target Date 2025 Trust	96,924	101,280	98,749	96,729	103,182	107,887	106,972
AK Target Date 2030 Trust	72,048	74,896	73,721	72,400	78,775	81,932	82,673
AK Target Date 2035 Trust	70,541	74,596	72,813	71,820	80,204	83,541	83,706
AK Target Date 2040 Trust	72,115	76,031	73,662	72,385	80,317	83,551	83,390
AK Target Date 2045 Trust	81,618	87,042	84,858	83,293	92,463	97,126	97,165
AK Target Date 2050 Trust	90,760	96,238	93,684	92,386	102,744	107,828	108,165
AK Target Date 2055 Trust	89,572	95,384	93,498	92,255	103,623	108,599	108,550
AK Target Date 2060 Trust	3,289	3,633	3,685	3,713	4,258	4,679	5,247
AK Target Date 2065 Trust	642	778	708	877	1,346	1,147	1,129
State Street Global Advisors							
Money Market	71,394	73,758	76,290	80,188	80,315	76,674	75,856
S&P 500 Stock Index Fund Series A	436,717	462,900	439,674	415,913	455,166	473,831	457,818
Russell 3000 Index	125,246	129,139	124,372	121,779	136,759	139,353	133,558
World Equity Ex-US Index	58,383	57,546	58,638	59,382	69,468	69,780	65,414
Investments with BlackRock							
Passive U.S. Bond Index Fund	203,034	205,613	203,701	204,499	203,785	204,623	205,787
Strategic Completion Fund	33,792	33,816	33,081	31,818	33,696	33,850	33,012
Investments with Brandes/Baillie Gifford							
AK International Equity Fund	83,511	90,728	88,511	85,914	99,609	109,018	112,511
Investments with Northern Trust							
Environmental, Social, and Governance Fund	112,784	122,897	115,825	110,716	121,962	132,659	134,905
Total Invested Assets	\$ 4,348,738	\$ 4,483,686	\$ 4,400,443	\$ 4,342,107	\$ 4,628,742	\$ 4,744,918	\$ 4,724,085
<u>Change in Invested Assets</u>							
Beginning Assets	\$ 4,226,458	\$ 4,348,738	\$ 4,483,686	\$ 4,400,443	\$ 4,342,107	\$ 4,628,742	\$ 4,744,918
Investment Earnings	132,677	149,038	(77,761)	(42,100)	293,627	128,335	(10,613)
Net Contributions (Withdrawals)	(10,397)	(14,090)	(5,482)	(16,236)	(6,992)	(12,159)	(10,220)
Ending Invested Assets	\$ 4,348,738	\$ 4,483,686	\$ 4,400,443	\$ 4,342,107	\$ 4,628,742	\$ 4,744,918	\$ 4,724,085

Deferred Compensation Plan
Schedule of Invested Assets and Changes in Invested Assets
for the Month Ended
January 31, 2021

	<u>Beginning Invested</u> <u>Assets</u>	<u>Investment Income</u>	<u>Net Contributions</u> <u>(Withdrawals)</u>	<u>Transfers In (Out)</u>	<u>Ending Invested</u> <u>Assets</u>	<u>% Change in</u> <u>Invested</u> <u>Assets</u>	<u>% Change due</u> <u>to Investment</u> <u>Income (1)</u>
Participant Options							
T. Rowe Price							
Stable Value Fund	\$ 207,736,858	\$ 353,700	\$ (1,496,556)	\$ 2,677,472	\$ 209,271,474	0.74%	0.17%
Small Cap Stock Fund	138,703,176	1,214,885	(81,737)	(1,307,759)	138,528,565	-0.13%	0.88%
Alaska Balanced Trust	34,118,322	(73,970)	(54,854)	880,724	34,870,222	2.20%	-0.21%
Long Term Balanced Fund	90,606,541	(231,897)	(85,750)	427,408	90,716,302	0.12%	-0.26%
AK Target Date 2010 Trust	3,362,107	(6,176)	(11,328)	54,878	3,399,481	1.11%	-0.18%
AK Target Date 2015 Trust	10,484,813	(18,850)	(18,101)	(62,727)	10,385,135	-0.95%	-0.18%
AK Target Date 2020 Trust	23,997,396	(53,699)	(102,014)	427,679	24,269,362	1.13%	-0.22%
AK Target Date 2025 Trust	27,425,655	(75,554)	(203,901)	849,139	27,995,339	2.08%	-0.27%
AK Target Date 2030 Trust	16,116,144	(56,296)	143,449	292,935	16,496,232	2.36%	-0.34%
AK Target Date 2035 Trust	11,227,288	(24,189)	174,547	(368,953)	11,008,693	-1.95%	-0.22%
AK Target Date 2040 Trust	11,208,290	(37,488)	134,190	(53,357)	11,251,635	0.39%	-0.33%
AK Target Date 2045 Trust	8,824,845	(26,435)	94,484	(153,057)	8,739,837	-0.96%	-0.30%
AK Target Date 2050 Trust	6,584,186	(27,445)	134,392	92,645	6,783,778	3.03%	-0.41%
AK Target Date 2055 Trust	5,737,034	(10,659)	85,930	(371,647)	5,440,658	-5.17%	-0.19%
AK Target Date 2060 Trust	1,175,664	(5,869)	20,414	15,277	1,205,486	2.54%	-0.49%
AK Target Date 2065 Trust	415,839	(761)	8,530	(75,324)	348,284	-16.25%	-0.20%
Total Investments with T. Rowe Price	<u>597,724,158</u>	<u>919,297</u>	<u>(1,258,305)</u>	<u>3,325,333</u>	<u>600,710,483</u>		
State Street Global Advisors							
Money Market	24,908,867	213	47,867	(138,961)	24,817,986	-0.36%	0.00%
S&P 500 Stock Index	250,349,320	(2,345,659)	(1,613,048)	(4,873,227)	241,517,386	-3.53%	-0.95%
Russell 3000 Index	44,849,513	(245,260)	218,719	421,672	45,244,644	0.88%	-0.54%
World Equity Ex-US Index	22,029,306	65,761	26,233	(1,363,620)	20,757,680	-5.77%	0.31%
Total Investments with SSgA	<u>342,137,006</u>	<u>(2,524,945)</u>	<u>(1,320,229)</u>	<u>(5,954,136)</u>	<u>332,337,696</u>		
BlackRock							
Passive U.S. Bond Index Fund	86,670,201	(620,704)	(408,217)	1,225,284	86,866,564	0.23%	-0.71%
Strategic Completion Fund	14,958,384	41,657	(78,479)	(155,755)	14,765,807	-1.29%	0.28%
Total Investments with BlackRock	<u>101,628,585</u>	<u>(579,047)</u>	<u>(486,696)</u>	<u>1,069,529</u>	<u>101,632,371</u>		
Brandes/Baillie Gifford (2)							
AK International Equity Fund	47,481,504	221,326	118,127	1,138,173	48,959,130	3.11%	0.46%
Northern Trust							
Environmental, Social, and Governance Fund	45,964,903	(393,418)	27,437	421,101	46,020,023	0.12%	-0.85%
Total All Funds	<u>\$ 1,134,936,156</u>	<u>\$ (2,356,787)</u>	<u>\$ (2,919,666)</u>	<u>\$ -</u>	<u>\$ 1,129,659,703</u>	-0.46%	-0.21%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

(2) This investment is comprised of two funds, Brandes International Equity Fund and Baillie Gifford International Equity Fund.

Deferred Compensation Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2021
\$ (Thousands)

Invested Assets (at fair value)	July	August	September	October	November	December	January
Investments with T. Rowe Price							
Stable Value Fund	\$ 205,336	\$ 207,965	\$ 209,048	\$ 209,984	\$ 209,731	\$ 207,737	\$ 209,271
Small Cap Stock Fund	114,274	117,607	114,901	117,127	130,654	138,703	138,529
Alaska Balanced Trust	28,531	28,203	28,946	30,242	33,138	34,118	34,870
Long Term Balanced Fund	80,739	83,115	82,031	82,082	89,037	90,607	90,716
AK Target Date 2010 Trust	3,405	3,498	3,453	3,352	3,525	3,362	3,399
AK Target Date 2015 Trust	9,902	10,202	10,041	9,844	10,379	10,485	10,385
AK Target Date 2020 Trust	23,102	23,815	23,216	22,220	23,553	23,997	24,269
AK Target Date 2025 Trust	23,997	25,472	24,132	24,083	25,756	27,426	27,995
AK Target Date 2030 Trust	13,690	14,287	14,115	13,925	15,378	16,116	16,496
AK Target Date 2035 Trust	9,250	9,860	9,649	9,563	10,777	11,227	11,009
AK Target Date 2040 Trust	9,767	10,415	10,169	9,763	10,690	11,208	11,252
AK Target Date 2045 Trust	7,338	7,760	7,642	7,303	8,143	8,825	8,740
AK Target Date 2050 Trust	5,155	5,469	5,418	5,357	6,014	6,584	6,784
AK Target Date 2055 Trust	4,906	5,299	5,200	5,068	5,623	5,737	5,441
AK Target Date 2060 Trust	890	955	939	940	1,078	1,176	1,205
AK Target Date 2065 Trust	181	183	182	161	197	416	348
State Street Global Advisors							
Money Market	23,303	23,948	24,254	25,256	25,393	24,909	24,818
S&P 500 Stock Index	224,966	239,819	229,011	220,831	243,237	250,349	241,517
Russell 3000 Index	38,995	41,650	39,470	37,836	42,853	44,850	45,245
World Equity Ex-US Index	17,976	18,012	18,370	18,574	21,684	22,029	20,758
Investments with BlackRock							
Passive U.S. Bond Index Fund	89,300	89,452	89,054	88,593	87,626	86,670	86,867
Strategic Completion Fund	14,840	14,892	14,641	14,075	14,823	14,958	14,766
Investments with Brandes/Baillie Gifford							
AK International Equity Fund	37,777	40,072	39,178	38,048	44,325	47,482	48,959
Investments with Northern Trust							
Environmental, Social, and Governance Fund	40,738	43,478	41,023	39,139	42,759	45,965	46,020
Total Invested Assets	\$ 1,028,357	\$ 1,065,430	\$ 1,044,083	\$ 1,033,367	\$ 1,106,376	\$ 1,134,936	\$ 1,129,660
Change in Invested Assets							
Beginning Assets	\$ 998,966	\$ 1,028,357	\$ 1,065,430	\$ 1,044,083	\$ 1,033,367	\$ 1,106,376	\$ 1,134,936
Investment Earnings	32,812	38,421	(19,581)	(7,945)	75,283	33,765	(2,357)
Net Contributions (Withdrawals)	(3,421)	(1,348)	(1,767)	(2,772)	(2,274)	(5,205)	(2,920)
Ending Invested Assets	\$ 1,028,357	\$ 1,065,430	\$ 1,044,083	\$ 1,033,367	\$ 1,106,376	\$ 1,134,936	\$ 1,129,660

Defined Contribution Retirement - Participant Directed PERS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
January 31, 2021

	<u>Beginning Invested</u>		<u>Net Contributions</u>		<u>Ending Invested</u>	<u>% Change in</u>	<u>% Change due</u>
	<u>Assets</u>	<u>Investment Income</u>	<u>(Withdrawals)</u>	<u>Transfers In (Out)</u>	<u>Assets</u>	<u>Assets</u>	<u>to Investment</u>
							<u>Income (1)</u>
Participant Options							
T. Rowe Price							
Stable Value Fund	\$ 98,473,668	\$ 172,416	\$ (144,390)	\$ 5,406,706	\$ 103,908,400	5.52%	0.17%
Small Cap Stock Fund	110,885,604	999,025	120,163	(1,882,740)	110,122,052	-0.69%	0.91%
Alaska Balanced Trust	22,211,263	(58,592)	(151,080)	2,037,741	24,039,332	8.23%	-0.25%
Long Term Balanced Fund	17,320,064	(45,877)	(135,459)	262,291	17,401,019	0.47%	-0.26%
AK Target Date 2010 Trust	3,024,742	(6,995)	11,763	146,655	3,176,165	5.01%	-0.23%
AK Target Date 2015 Trust	12,997,218	(22,953)	(21,897)	1,998	12,954,366	-0.33%	-0.18%
AK Target Date 2020 Trust	43,864,375	(89,728)	(311,042)	(68,803)	43,394,802	-1.07%	-0.21%
AK Target Date 2025 Trust	78,982,407	(204,739)	630,455	(188,646)	79,219,477	0.30%	-0.26%
AK Target Date 2030 Trust	85,517,327	(242,712)	724,540	(262,537)	85,736,618	0.26%	-0.28%
AK Target Date 2035 Trust	107,269,713	(305,699)	676,676	(432,778)	107,207,912	-0.06%	-0.28%
AK Target Date 2040 Trust	125,614,483	(384,959)	840,794	(311,581)	125,758,737	0.11%	-0.31%
AK Target Date 2045 Trust	163,041,444	(542,309)	1,262,511	(100,790)	163,660,856	0.38%	-0.33%
AK Target Date 2050 Trust	195,341,954	(664,585)	1,397,547	(418,945)	195,655,971	0.16%	-0.34%
AK Target Date 2055 Trust	201,802,373	(684,026)	2,348,126	(991,685)	202,474,788	0.33%	-0.34%
AK Target Date 2060 Trust	3,930,043	(20,780)	375,671	11,377	4,296,311	9.32%	-0.50%
AK Target Date 2065 Trust	1,444,419	(7,662)	135,890	10,314	1,582,961	9.59%	-0.50%
Total Investments with T. Rowe Price	<u>1,271,721,097</u>	<u>(2,110,175)</u>	<u>7,760,268</u>	<u>3,218,577</u>	<u>1,280,589,767</u>		
State Street Global Advisors							
Money Market	18,906,476	272	(39,656)	(1,111,025)	17,756,067	-6.08%	0.00%
S&P 500 Stock Index Fund Series A	65,823,710	(653,131)	108,557	103,155	65,382,291	-0.67%	-0.99%
Russell 3000 Index	79,587,291	(293,303)	246,658	(5,514,372)	74,026,274	-6.99%	-0.38%
World Equity Ex-US Index	60,735,283	236,908	125,163	(5,907,061)	55,190,293	-9.13%	0.41%
Total Investments with SSgA	<u>225,052,760</u>	<u>(709,254)</u>	<u>440,722</u>	<u>(12,429,303)</u>	<u>212,354,925</u>		
BlackRock							
Passive U.S. Bond Index Fund	84,767,354	(608,243)	(27,151)	1,922,268	86,054,228	1.52%	-0.71%
Strategic Completion Fund	4,430,232	12,715	(9,773)	257,016	4,690,190	5.87%	0.28%
Total Investments with BlackRock	<u>89,197,586</u>	<u>(595,528)</u>	<u>(36,924)</u>	<u>2,179,284</u>	<u>90,744,418</u>		
Brandes/Baillie Gifford (2)							
AK International Equity Fund	77,571,279	350,054	66,206	2,348,409	80,335,948	3.56%	0.44%
Northern Trust							
Environmental, Social, and Governance Fund	67,291,752	(645,402)	49,485	4,683,033	71,378,868	6.07%	-0.93%
Total All Funds	<u>\$ 1,730,834,474</u>	<u>\$ (3,710,305)</u>	<u>\$ 8,279,757</u>	<u>\$ -</u>	<u>\$ 1,735,403,926</u>	0.26%	-0.21%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

(2) This investment is comprised of two funds, Brandes International Equity Fund and Baillie Gifford International Equity Fund.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2021
\$ (Thousands)

<u>Invested Assets (at fair value)</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>	<u>January</u>
Investments with T. Rowe Price							
Stable Value Fund	\$ 80,056	\$ 83,080	\$ 87,494	\$ 91,379	\$ 94,929	\$ 98,474	\$ 103,908
Small Cap Stock Fund	95,973	98,531	94,742	95,244	104,585	110,886	110,122
Alaska Balanced Trust	6,172	5,193	9,886	14,459	20,274	22,211	24,039
Long Term Balanced Fund	6,440	6,699	9,540	12,526	16,691	17,320	17,401
AK Target Date 2010 Trust	3,080	3,170	3,201	3,176	3,167	3,025	3,176
AK Target Date 2015 Trust	12,097	12,415	12,240	12,031	12,781	12,997	12,954
AK Target Date 2020 Trust	39,535	40,661	40,208	39,953	42,716	43,864	43,395
AK Target Date 2025 Trust	68,499	71,793	70,370	69,734	75,798	78,982	79,219
AK Target Date 2030 Trust	73,322	76,603	75,419	74,524	81,833	85,517	85,737
AK Target Date 2035 Trust	90,031	95,192	93,429	92,478	102,392	107,270	107,208
AK Target Date 2040 Trust	105,521	111,723	108,929	107,516	119,694	125,614	125,759
AK Target Date 2045 Trust	135,169	143,639	140,645	138,355	154,684	163,041	163,661
AK Target Date 2050 Trust	161,065	171,252	167,334	165,706	185,321	195,342	195,656
AK Target Date 2055 Trust	162,577	173,757	170,670	169,804	190,707	201,802	202,475
AK Target Date 2060 Trust	2,275	2,534	2,658	2,808	3,409	3,930	4,296
AK Target Date 2065 Trust	653	755	801	947	1,208	1,444	1,583
State Street Global Advisors							
Money Market	13,567	14,358	17,810	21,330	21,786	18,906	17,756
S&P 500 Stock Index Fund Series A	64,044	72,147	64,969	58,566	61,578	65,824	65,382
Russell 3000 Index	76,824	80,528	75,585	72,352	80,161	79,587	74,026
World Equity Ex-US Index	54,283	52,501	52,890	53,884	62,226	60,735	55,190
Investments with BlackRock							
Passive U.S. Bond Index Fund	89,420	91,328	88,983	86,748	84,354	84,767	86,054
Strategic Completion Fund	4,134	4,178	4,101	3,977	4,270	4,430	4,690
Investments with Brandes/Baillie Gifford							
AK International Equity Fund	60,432	65,756	63,518	61,281	70,450	77,571	80,336
Investments with Northern Trust							
Environmental, Social, and Governance Fund	54,747	58,637	55,816	53,817	59,968	67,292	71,379
Total Invested Assets	\$ 1,459,912	\$ 1,536,430	\$ 1,511,237	\$ 1,502,597	\$ 1,654,982	\$ 1,730,834	\$ 1,735,404
Change in Invested Assets							
Beginning Assets	\$ 1,394,890	\$ 1,459,912	\$ 1,536,430	\$ 1,511,237	\$ 1,502,597	\$ 1,654,982	\$ 1,730,834
Investment Earnings	57,470	68,222	(35,705)	(18,995)	141,940	63,195	(3,710)
Net Contributions (Withdrawals)	7,552	8,296	10,512	10,355	10,445	12,657	8,280
Ending Invested Assets	\$ 1,459,912	\$ 1,536,430	\$ 1,511,237	\$ 1,502,597	\$ 1,654,982	\$ 1,730,834	\$ 1,735,404

Defined Contribution Retirement - Participant Directed TRS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
January 31, 2021

	<u>Beginning Invested</u> <u>Assets</u>	<u>Investment Income</u>	<u>Net Contributions</u> <u>(Withdrawals)</u>	<u>Transfers In (Out)</u>	<u>Ending Invested</u> <u>Assets</u>	<u>% Change in</u> <u>Invested</u> <u>Assets</u>	<u>% Change due</u> <u>to Investment</u> <u>Income (1)</u>
Participant Options							
T. Rowe Price							
Stable Value Fund	\$ 38,615,369	\$ 67,266	\$ (156,917)	\$ 2,057,434	\$ 40,583,152	5.10%	0.17%
Small Cap Stock Fund	44,966,399	402,275	111,818	(761,560)	44,718,932	-0.55%	0.90%
Alaska Balanced Trust	8,251,840	(23,298)	22,599	842,189	9,093,330	10.20%	-0.27%
Long Term Balanced Fund	6,972,614	(20,613)	19,533	194,932	7,166,466	2.78%	-0.29%
AK Target Date 2010 Trust	1,136,501	(2,088)	5,235	-	1,139,648	0.28%	-0.18%
AK Target Date 2015 Trust	3,846,333	(5,434)	18,962	(190,238)	3,669,623	-4.59%	-0.14%
AK Target Date 2020 Trust	13,299,241	(28,370)	103,664	(78,334)	13,296,201	-0.02%	-0.21%
AK Target Date 2025 Trust	24,391,267	(67,321)	99,533	268,801	24,692,280	1.23%	-0.27%
AK Target Date 2030 Trust	32,395,755	(96,454)	325,347	85,958	32,710,606	0.97%	-0.30%
AK Target Date 2035 Trust	45,604,109	(128,601)	371,443	(234,560)	45,612,391	0.02%	-0.28%
AK Target Date 2040 Trust	52,965,542	(167,731)	378,890	(6,267)	53,170,434	0.39%	-0.32%
AK Target Date 2045 Trust	77,031,080	(257,885)	421,684	(28,316)	77,166,563	0.18%	-0.33%
AK Target Date 2050 Trust	108,957,449	(370,107)	368,467	(232,678)	108,723,131	-0.22%	-0.34%
AK Target Date 2055 Trust	67,529,685	(236,183)	625,917	(199,486)	67,719,933	0.28%	-0.35%
AK Target Date 2060 Trust	1,228,105	(6,592)	105,211	-	1,326,724	8.03%	-0.51%
AK Target Date 2065 Trust	127,769	(762)	11,029	-	138,036	8.04%	-0.57%
Total Investments with T. Rowe Price	<u>527,319,058</u>	<u>(941,898)</u>	<u>2,832,415</u>	<u>1,717,875</u>	<u>530,927,450</u>		
State Street Global Advisors							
Money Market	6,933,752	55	28,592	(1,294,585)	5,667,814	-18.26%	0.00%
S&P 500 Stock Index Fund Series A	19,330,592	(208,927)	75,114	513,596	19,710,375	1.96%	-1.06%
Russell 3000 Index	33,040,001	(124,340)	92,287	(2,451,012)	30,556,936	-7.52%	-0.39%
World Equity Ex-US Index	26,223,204	103,341	69,881	(2,600,394)	23,796,032	-9.26%	0.41%
Total Investments with SSgA	<u>85,527,549</u>	<u>(229,871)</u>	<u>265,874</u>	<u>(5,832,395)</u>	<u>79,731,157</u>		
BlackRock							
Passive U.S. Bond Index Fund	33,802,153	(244,214)	95,004	752,720	34,405,663	1.79%	-0.71%
Strategic Completion Fund	1,357,345	3,920	9,981	(24,119)	1,347,127	-0.75%	0.29%
Total Investments with BlackRock	<u>35,159,498</u>	<u>(240,294)</u>	<u>104,985</u>	<u>728,601</u>	<u>35,752,790</u>		
Brandes/Baillie Gifford (2)							
AK International Equity Fund	32,979,016	140,271	85,547.00	1,150,136	34,354,970	4.17%	0.42%
Northern Trust							
Environmental, Social, and Governance Fund	28,475,156	(284,882)	70,138.00	2,235,783	30,496,195	7.10%	-0.96%
Total All Funds	<u>\$ 709,460,277</u>	<u>\$ (1,556,674)</u>	<u>\$ 3,358,959</u>	<u>\$ -</u>	<u>\$ 711,262,562</u>	0.25%	-0.22%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

(2) This investment is comprised of two funds, Brandes International Equity Fund and Baillie Gifford International Equity Fund.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
January 31, 2021
\$ (Thousands)

<u>Invested Assets (at fair value)</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>	<u>January</u>
Investments with T. Rowe Price							
Stable Value Fund	\$ 31,324	\$ 33,005	\$ 33,819	\$ 35,426	\$ 37,071	\$ 38,615	\$ 40,583
Small Cap Stock Fund	40,640	41,198	39,239	39,353	42,554	44,966	44,719
Alaska Balanced Trust	1,456	974	2,903	4,989	7,462	8,252	9,093
Long Term Balanced Fund	2,518	2,580	3,802	4,962	6,652	6,973	7,166
AK Target Date 2010 Trust	1,027	1,054	1,043	1,041	1,102	1,137	1,140
AK Target Date 2015 Trust	3,973	3,818	3,782	3,607	3,848	3,846	3,670
AK Target Date 2020 Trust	12,133	12,377	11,993	11,962	12,900	13,299	13,296
AK Target Date 2025 Trust	21,903	22,699	21,971	21,672	23,620	24,391	24,692
AK Target Date 2030 Trust	27,943	28,909	28,201	28,040	30,917	32,396	32,711
AK Target Date 2035 Trust	39,332	40,946	40,011	39,609	43,504	45,604	45,612
AK Target Date 2040 Trust	44,653	46,518	45,538	44,926	50,146	52,966	53,170
AK Target Date 2045 Trust	64,726	68,216	66,265	65,461	73,340	77,031	77,167
AK Target Date 2050 Trust	91,622	96,600	93,618	92,633	103,711	108,957	108,723
AK Target Date 2055 Trust	55,732	58,638	57,167	56,882	63,905	67,530	67,720
AK Target Date 2060 Trust	642	679	695	800	1,022	1,228	1,327
AK Target Date 2065 Trust	67	71	74	86	109	128	138
State Street Global Advisors							
Money Market	4,593	4,324	5,779	7,055	8,192	6,934	5,668
S&P 500 Stock Index Fund Series A	20,914	23,623	20,868	18,143	18,334	19,331	19,710
Russell 3000 Index	32,959	34,043	31,978	30,694	33,599	33,040	30,557
World Equity Ex-US Index	24,234	23,131	23,080	23,371	26,886	26,223	23,796
Investments with BlackRock							
Passive U.S. Bond Index Fund	36,533	37,407	35,855	34,669	33,570	33,802	34,406
Strategic Completion Fund	1,345	1,444	1,267	1,249	1,364	1,357	1,347
Investments with Brandes/Baillie Gifford							
AK International Equity Fund	26,438	28,458	27,280	26,255	29,979	32,979	34,355
Investments with Northern Trust							
Environmental, Social, and Governance Fund	23,663	24,912	23,719	22,818	25,322	28,475	30,496
Total Invested Assets	\$ 610,370	\$ 635,624	\$ 619,945	\$ 615,705	\$ 679,107	\$ 709,460	\$ 711,263
Change in Invested Assets							
Beginning Assets	\$ 581,114	\$ 610,370	\$ 635,624	\$ 619,945	\$ 615,705	\$ 679,107	\$ 709,460
Investment Earnings	24,312	28,829	(14,972)	(7,901)	59,262	26,356	(1,557)
Net Contributions (Withdrawals)	4,944	(3,575)	(707)	3,661	4,141	3,998	3,359
Ending Invested Assets	\$ 610,370	\$ 635,624	\$ 619,945	\$ 615,705	\$ 679,107	\$ 709,460	\$ 711,263

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT

(Supplement to the Treasury Division Report)

As of January 31, 2021

Prepared by the Division of Retirement & Benefits

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Seven Months Ending January 31, 2021

	Contributions				Expenditures				Net Contributions/ (Withdrawals)
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	
Public Employees' Retirement System (PERS)									
<u>Defined Benefit Plans:</u>									
Retirement Pension Trust	\$ 218,848,952	\$ 203,585,000	\$ 26,207	\$ 422,460,159	\$ (537,937,795)	\$ (4,502,234)	\$ (2,750,505)	\$ (545,190,534)	\$ (122,730,375)
Retirement Health Care Trust	43,024,440	-	53,954,224	96,978,664	(263,056,852)	-	(13,369,876)	(276,426,728)	(179,448,064)
Total Defined Benefit Plans	261,873,392	203,585,000	53,980,431	519,438,823	(800,994,647)	(4,502,234)	(16,120,381)	(821,617,262)	(302,178,439)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	107,165,560	-	-	107,165,560	-	(35,412,787)	(3,656,598)	(39,069,385)	68,096,175
Health Reimbursement Arrangement ^(a)	26,637,640	-	-	26,637,640	(134,478)	-	(81,834)	(216,312)	26,421,328
Retiree Medical Plan ^(a)	10,635,334	-	52,078	10,687,412	(294,909)	-	(48,710)	(343,619)	10,343,793
Occupational Death and Disability: ^(a)									
All Others	2,127,439	-	-	2,127,439	(63,513)	-	(7,784)	(71,297)	2,056,142
Peace Officers and Firefighters	851,256	-	-	851,256	(199,545)	-	(11,240)	(210,785)	640,471
Total Defined Contribution Plans	147,417,229	-	52,078	147,469,307	(692,445)	(35,412,787)	(3,806,166)	(39,911,398)	107,557,909
Total PERS	409,290,621	203,585,000	54,032,509	666,908,130	(801,687,092)	(39,915,021)	(19,926,547)	(861,528,660)	(194,620,530)
Teachers' Retirement System (TRS)									
<u>Defined Benefit Plans:</u>									
Retirement Pension Trust	31,657,604	134,976,000	21,741	166,655,345	(293,133,187)	(726,259)	(1,438,871)	(295,298,317)	(128,642,972)
Retirement Health Care Trust	11,790,217	-	18,213,288	30,003,505	(83,736,912)	-	(3,949,301)	(87,686,213)	(57,682,708)
Total Defined Benefit Plans	43,447,821	134,976,000	18,235,029	196,658,850	(376,870,099)	(726,259)	(5,388,172)	(382,984,530)	(186,325,680)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	33,408,018	-	-	33,408,018	-	(16,268,189)	(1,319,756)	(17,587,945)	15,820,073
Health Reimbursement Arrangement ^(a)	6,632,388	-	-	6,632,388	(59,774)	-	(24,500)	(84,274)	6,548,114
Retiree Medical Plan ^(a)	2,195,866	-	2,669	2,198,535	(179,742)	-	(25,606)	(205,348)	1,993,187
Occupational Death and Disability ^(a)	176,548	-	-	176,548	(14,171)	-	(4,564)	(18,735)	157,813
Total Defined Contribution Plans	42,412,820	-	2,669	42,415,489	(253,687)	(16,268,189)	(1,374,426)	(17,896,302)	24,519,187
Total TRS	85,860,641	134,976,000	18,237,698	239,074,339	(377,123,786)	(16,994,448)	(6,762,598)	(400,880,832)	(161,806,493)
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Pension Trust	4,018,912	5,145,000	-	9,163,912	(8,368,692)	-	(74,214)	(8,442,906)	721,006
Defined Benefit Plan Retirement Health Care Trust	416,483	-	139,120	555,603	(1,068,890)	-	(41,170)	(1,110,060)	(554,457)
Total JRS	4,435,395	5,145,000	139,120	9,719,515	(9,437,582)	-	(115,384)	(9,552,966)	166,549
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Pension Trust ^(a)	-	-	-	-	(975,197)	-	(86,223)	(1,061,420)	(1,061,420)
Other Participant Directed Plans									
Supplemental Annuity Plan	94,640,059	-	-	94,640,059	-	(166,172,849)	(4,043,513)	(170,216,362)	(75,576,303)
Deferred Compensation Plan	26,377,824	-	-	26,377,824	-	(44,760,878)	(1,322,711)	(46,083,589)	(19,705,765)
Total All Funds	620,604,540	343,706,000	72,409,327	1,036,719,867	(1,189,223,657)	(267,843,196)	(32,256,976)	(1,489,323,829)	(452,603,962)
Total Non-Participant Directed	359,013,079	343,706,000	72,409,327	775,128,406	(1,189,223,657)	(5,228,493)	(21,914,398)	(1,216,366,548)	(441,238,142)
Total Participant Directed	261,591,461	-	-	261,591,461	-	(262,614,703)	(10,342,578)	(272,957,281)	(11,365,820)
Total All Funds	\$ 620,604,540	\$ 343,706,000	\$ 72,409,327	\$ 1,036,719,867	\$ (1,189,223,657)	\$ (267,843,196)	\$ (32,256,976)	\$ (1,489,323,829)	\$ (452,603,962)

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Month Ended January 31, 2021

	Contributions			Total Contributions	Expenditures				Net Contributions/ (Withdrawals)
	Contributions EE and ER	State of Alaska	Other		Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	
Public Employees' Retirement System (PERS)									
<u>Defined Benefit Plans:</u>									
Retirement Pension Trust	\$ 34,096,718	\$ -	\$ 12,521	\$ 34,109,239	\$ (76,933,664)	\$ (436,438)	\$ (478,144)	\$ (77,848,246)	\$ (43,739,007)
Retirement Health Care Trust	6,563,230	-	8,636,679	15,199,909	(35,941,335)	-	(1,656,942)	(37,598,277)	(22,398,368)
Total Defined Benefit Plans	40,659,948	-	8,649,200	49,309,148	(112,874,999)	(436,438)	(2,135,086)	(115,446,523)	(66,137,375)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	15,707,113	-	-	15,707,113	-	(6,775,349)	(652,007)	(7,427,356)	8,279,757
Health Reimbursement Arrangement ^(a)	3,918,407	-	-	3,918,407	(9,915)	-	(17,253)	(27,168)	3,891,239
Retiree Medical Plan ^(a)	1,549,522	-	10,285	1,559,807	(25,253)	-	(6,587)	(31,840)	1,527,967
Occupational Death and Disability: ^(a)									
All Others	319,153	-	-	319,153	(9,070)	-	(924)	(9,994)	309,159
Peace Officers and Firefighters	125,247	-	-	125,247	(27,348)	-	(462)	(27,810)	97,437
Total Defined Contribution Plans	21,619,442	-	10,285	21,629,727	(71,586)	(6,775,349)	(677,233)	(7,524,168)	14,105,559
Total PERS	62,279,390	-	8,659,485	70,938,875	(112,946,585)	(7,211,787)	(2,812,319)	(122,970,691)	(52,031,816)
Teachers' Retirement System (TRS)									
<u>Defined Benefit Plans:</u>									
Retirement Pension Trust	4,599,024	-	8,083	4,607,107	(41,671,866)	(105,847)	(235,947)	(42,013,660)	(37,406,553)
Retirement Health Care Trust	1,838,337	-	2,962,844	4,801,181	(11,208,127)	-	(600,645)	(11,808,772)	(7,007,591)
Total Defined Benefit Plans	6,437,361	-	2,970,927	9,408,288	(52,879,993)	(105,847)	(836,592)	(53,822,432)	(44,414,144)
<u>Defined Contribution Plans:</u>									
Participant Directed Retirement	4,945,809	-	-	4,945,809	-	(1,308,940)	(277,910)	(1,586,850)	3,358,959
Health Reimbursement Arrangement ^(a)	960,885	-	-	960,885	(3,005)	-	(5,102)	(8,107)	952,778
Retiree Medical Plan ^(a)	313,113	-	309	313,422	(10,375)	-	(2,265)	(12,640)	300,782
Occupational Death and Disability: ^(a)									
Total Defined Contribution Plans	6,246,186	-	309	6,246,495	(15,404)	(1,308,940)	(285,472)	(1,609,816)	4,636,679
Total TRS	12,683,547	-	2,971,236	15,654,783	(52,895,397)	(1,414,787)	(1,122,064)	(55,432,248)	(39,777,465)
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Pension Trust	657,980	-	-	657,980	(1,178,346)	-	(7,119)	(1,185,465)	(527,485)
Defined Benefit Plan Retirement Health Care Trust	68,022	-	26,665	94,687	(83,596)	-	(5,163)	(88,759)	5,928
Total JRS	726,002	-	26,665	752,667	(1,261,942)	-	(12,282)	(1,274,224)	(521,557)
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Pension Trust ^(a)	-	-	-	-	(83,161)	-	(3,355)	(86,516)	(86,516)
Other Participant Directed Plans									
Supplemental Annuity Plan	13,253,385	-	-	13,253,385	-	(22,634,537)	(838,909)	(23,473,446)	(10,220,061)
Deferred Compensation Plan	5,506,128	-	-	5,506,128	-	(8,168,064)	(257,730)	(8,425,794)	(2,919,666)
Total All Funds	94,448,452	-	11,657,386	106,105,838	(167,187,085)	(39,429,175)	-	(211,662,919)	(105,557,081)
Total Non-Participant Directed	55,036,017	-	11,657,386	66,693,403	(167,187,085)	(542,285)	(3,020,103)	(170,749,473)	(104,056,070)
Total Participant Directed	39,412,435	-	-	39,412,435	-	(38,886,890)	(2,026,556)	(40,913,446)	(1,501,011)
Total All Funds	\$ 94,448,452	\$ -	\$ 11,657,386	\$ 106,105,838	\$ (167,187,085)	\$ (39,429,175)	\$ (5,046,659)	\$ (211,662,919)	\$ (105,557,081)

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Seven Months Ending January 31, 2021

PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND TYPE						
Type	PERS DCR Plan	TRS DCR Plan	Supplemental Annuity Plan	Deferred Compensation	TOTAL	% of Total
Payment to Beneficiary	\$ 77,454	\$ -	\$ 312,201	\$ 53,189	\$ 442,844	0.2%
Death Benefit	815,469	447,227	9,544,291	1,689,310	12,496,297	4.8%
Disability / Hardship	-	113,179	2,281	65,323	180,783	0.1%
Minimum Required Distribution	53,091	9,476	5,238,155	1,523,159	6,823,881	2.6%
Qualified Domestic Relations Order	580,894	87,104	1,857,893	351,156	2,877,047	1.1%
Separation from Service / Retirement	33,885,879	15,611,203	120,773,689	37,102,796	207,373,567	78.9%
Purchase of Service Credit	-	-	434,205	217,586	651,791	0.2%
CARES Act Distributions	-	-	28,010,134	3,758,359	31,768,493	12.1%
TOTAL	<u>\$ 35,412,787</u>	<u>\$ 16,268,189</u>	<u>\$ 166,172,849</u>	<u>\$ 44,760,878</u>	<u>\$ 262,614,703</u>	<u>100.0%</u>

PERS & TRS PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND VESTED PERCENTAGE				
Vesting	PERS DCR Plan	TRS DCR Plan	TOTAL	% of Total
100% Vested	\$ 31,012,501	\$ 14,671,650	\$ 45,684,151	88.3%
75% Vested	893,890	426,251	1,320,141	2.6%
50% Vested	906,300	286,607	1,192,907	2.3%
25% Vested	1,016,639	473,282	1,489,921	2.9%
0% Vested	1,583,457	410,399	1,993,856	3.9%
TOTAL	<u>\$ 35,412,787</u>	<u>\$ 16,268,189</u>	<u>\$ 51,680,976</u>	<u>100.0%</u>

DEFINED BENEFIT REFUNDS BY PLAN, TIER, CONTRIBUTION TYPE AND VESTED STATUS									
Contribution Type	PERS DB Pension Plan				TRS DB Pension Plan			JRS	TOTAL
	Tier 1	Tier 2	Tier 3	Total	Tier 1	Tier 2	Total	DB Pension Plan	DB Pension Plan
Mandatory Vested	\$ 29,846	\$ 37,602	\$ 1,183,156	\$ 1,250,604	\$ 60,162	\$ 176,069	\$ 236,231	\$ -	\$ 1,486,835.00
Mandatory Non-Vested	159,140	265,541	502,177	926,858	96,125	362,094	458,219	-	1,385,077
Geographic Differential	-	137,278	88,492	225,770	-	-	-	-	225,770
Voluntary Full	394,792	712,448	870,535	1,977,775	-	-	-	-	1,977,775
Indebtedness, Lagging & Partial	4,539	37,726	78,962	121,227	-	31,809	31,809	-	153,036
TOTAL	<u>\$ 588,317</u>	<u>\$ 1,190,595</u>	<u>\$ 2,723,322</u>	<u>\$ 4,502,234</u>	<u>\$ 156,287</u>	<u>\$ 569,972</u>	<u>\$ 726,259</u>	<u>\$ -</u>	<u>\$ 5,228,493</u>

Notes for the DRB Supplement to the Treasury Report

January 2021

This report is the DRB supplement to the Treasury Division's Financial Report. It expands the "Net Contributions/(Withdrawals)" column into contributions and expenditures. It shows contributions received from both employees and employers, contributions from the State of Alaska, and other non-investment income. This report also expands expenditures into benefits, refunds & disbursements, and administrative & investment expenditures.

The net amount of total contributions and total expenditures, presented as "Net Contributions/(Withdrawals)", agrees with the same column in the Treasury Division's Report. Page one shows the year-to-date totals for the first seven months of Fiscal Year 2021, while page two shows only the month of January 2021.

Highlights – On page one, for the seven months ending January 31, 2021:

- PERS DB Pension – Average employer and employee contributions of \$31.3 million per month; benefit payments of approximately \$76.8 million per month; refunds average \$643 thousand; and administrative and investment expenditures of \$393 thousand per month (DOR and DRB).
- PERS DB Healthcare – Average employer contributions of \$6.1 million per month; benefit payments of approximately \$37.6 million per month; other income of \$14.6 million from monthly OptumRx EGWP Subsidies; \$417 thousand from CMS-RDS; \$19.6 million from OptumRx Pharmacy Rebates (most recently received in December for 3rd Quarter CY2020 & CY2019 True-up; \$70 thousand from Aetna Pharmacy Rebates (most recently received in September for 4th Quarter CY2018); \$18.9 million from EGWP coverage gap discount plan (CGDP), (most recently received in January for 3rd Quarter CY2020); and average administrative and investment expenditures of \$1.9 million per month (DOR and DRB).
- PERS DC Pension – Average employer and employee contributions of \$15.3 million per month; participant disbursements average \$5.1 million per month; and average administrative and investment expenditures of \$522 thousand per month (DOR and DRB).
- PERS DCR Health – For HRA, RMP, and OD&D, only employer contributions average \$5.8 million per month on behalf of participating employees; benefit payments of approximately \$99 thousand per month. Currently, 67 benefits are being paid from the Occupational Death & Disability plans, 57 retirees are participating in RMP, and 84 retirees are participating in HRA. Other income of \$21 thousand from monthly OptumRx EGWP Subsidies; \$16 thousand from OptumRx Pharmacy Rebates (most recently received in December for 3rd Quarter CY2020 & CY2019 True-up; \$14 thousand from EGWP coverage gap discount plan (CGDP), (most recently received in January for 3rd Quarter CY2020); and administrative and investment expenditures were approximately \$21 thousand per month (DOR and DRB).
- TRS DB Pension - Average employer and employee contributions of \$4.5 million per month; benefit payments of approximately \$41.9 million per month; refunds average \$104 thousand; and average administrative and investment expenditures of \$206 thousand per month (DOR and DRB).
- TRS DB Healthcare – Average employer contributions of \$1.7 million per month; benefit payments of approximately \$12 million per month; other income of \$5.3 million from monthly OptumRx EGWP Subsidies; \$138 thousand from CMS-RDS; \$6.3 million from OptumRx Pharmacy Rebates (most recently received in December for 3rd Quarter CY2020 & CY2019 True-up); \$26 thousand from Aetna Pharmacy Rebates (most recently received in September for 4th Quarter CY2018); \$6.3 million from EGWP coverage gap discount plan (CGDP), (most recently received in January for 3rd Quarter CY2020); and average administrative and investment expenditures of \$564 thousand per month (DOR and DRB).

- TRS DC Pension – Average employer and employee contributions of \$4.8 million per month; participant disbursements average \$2.3 million per month; and average administrative and investment expenditures of \$189 thousand per month (DOR and DRB).
- TRS DCR Health – For HRA, RMP, and OD&D only, employer contributions average \$1.3 million per month on behalf of participating employees; benefit payments of approximately \$36 thousand per month. Currently, 19 benefits are being paid from the Occupational Death & Disability plans, 22 retirees are participating in RMP, and 23 retirees are participating in HRA. Other income of \$2 thousand was received from monthly OptumRx EGWP Subsidies; and administrative and investment expenditures were approximately \$8 thousand per month (DOR and DRB).
- JRS Pension – Average employer and employee contributions of \$574 thousand per month; benefit payments of approximately \$1.2 million per month; and average administrative and investment expenditures of \$11 thousand per month (DOR and DRB).
- JRS Healthcare – Average employer contributions of \$59 thousand per month; benefit payments of approximately \$153 thousand per month. Other income of \$47 thousand from monthly OptumRx EGWP Subsidies; \$1 thousand from CMS-RDS; \$27 thousand from OptumRx Pharmacy Rebates (most recently received in December for 3rd Quarter CY2020 & CY2019 True-up); \$63 thousand from EGWP coverage gap discount plan (CGDP) (most recently received in January for 3rd Quarter CY2020); and average administrative and investment expenditures of \$6 thousand per month (DOR and DRB).
- NGNMRS – A combination of lump-sum and monthly benefit payments of \$139 thousand per month; and average administrative and investment expenditures of \$12 thousand per month (DOR and DRB).
- SBS – Average employer and employee contributions and transfers in of \$13.5 million per month. Participant disbursements average of \$23.7 million per month; and average administrative and investment expenditures of \$578 thousand per month (DOR and DRB).
- Deferred Compensation – Average member-only contributions and transfers in of \$3.8 million per month; participant disbursements average of \$6.4 million per month; and average administrative and investment expenditures of \$189 thousand per month (DOR and DRB).

Highlights – On page two, activity for the one month of January 2021 only:

- PERS DB Healthcare – Other Income of \$8.6 million from OptumRx EGWP subsidies and EGWP CGDP.
- TRS DB Healthcare – Other Income of \$2.9 million from OptumRx EGWP subsidies and EGWP CGDP.
- JRS DB Healthcare – Other Income of \$26 thousand from OptumRx EGWP subsidies and EGWP CGDP.
- All other funds – Nothing significant to report.

If you have any questions or comments, please let me know.

REPORT ON ALASKA RETIREE HEALTH PLAN ADVISORY BOARD MEETING FEBRUARY 4, 2021

The advisory board facilitates engagement and coordination between the State's retirement systems' members, the ARMB, and the Commissioner regarding the administration of the retiree health plan. Following are items discussed at the February 4, 2021 meeting.

The Division of Retirement and Benefits, together with the Retiree Health Plan Advisory Board (RHPAB), is considering the feasibility of making various updates to the plan to bring it more in line with modern health plan offerings.

Retirees are encouraged to give suggestions about what they would like to see changed with the health plan, or comment about what is working well right now. The public can send feedback to the Division and the Board at AlaskaRHPAB@alaska.gov.

Medicare Advantage

A group Medicare Advantage plan is one option that the Division of Retirement and Benefits and the Retiree Health Plan Advisory Board are reviewing as part of the AlaskaCare retiree health plan modernization effort. The Division and the Board are evaluating whether a group Medicare Advantage plan would be feasible for the AlaskaCare retiree health plans.

The Division continues to see growth in carrier networks. It is considered feasible that carriers would meet the 51% CMS requirement for a MAPPO program requirement in 1 - 3 years. Estimated premiums appear to provide financial opportunity.

This possible Medicare Advantage Plan would be an alternative optional retiree health plan. Next steps will evaluate the impact on retiree plan(s) in aggregate and stakeholder discussions as this develops.

Phase I: Feasibility / Viability (Q1 2021)

- 1) Evaluating market interest (RFI has established there is).
- 2) Identifying initial benefit, cost, network opportunities for Medicare Advantage.
- 3) Identify alternatives, comparable offering for U65.
- 4) Outlining initial risks, challenges, opportunities.
- 5) Review legal considerations.
- 6) Review program trends and experience in other states.
- 7) Draft member communications (FAQs)

Phase II: Define Essential Parameters (Q1 2021)

- 1) Goals
 - 2) Objectives
 - 3) Requirements
 - 4) Desired Outcomes
- RHPAB Recommendation
DRB Decision Point



Memo to: Members of the ARMB Actuarial Committee

From: David Kershner and Scott Young

Re: Buck’s Meeting Materials for March 17, 2021 Actuarial Committee Meeting

The purpose of this memo is to provide a summary of our presentation materials and additional commentary for the March 17, 2021 Actuarial Committee meeting. For convenience, references to slide numbers from our presentation materials are provided.

Executive Summary of June 30, 2020 Valuation Results (PERS/TRS) [Slides 5-8]

- i. Assets did not perform as well as expected in FY20
 - a) FY20 market return of approximately 4.1% was less than the 7.38% expected return.
 - b) This resulted in FY20 *market* asset **losses** of \$556M (PERS) and \$274M (TRS).
 - c) Under the 5-year asset smoothing method, the FY20 *actuarial* asset **losses** were \$275M (PERS) and \$139M (TRS).
 - d) Deferred asset losses as of June 30, 2020 are \$420M (PERS) and \$210M (TRS).
- ii. Liabilities are less than expected
 - a) Primarily due to lower-than-expected inflation and better-than-expected medical/Rx claims experience, we have June 30, 2020 liability **gains** of:
 - i. PERS: \$91M (pension), \$350M (healthcare), \$441M (total)
 - ii. TRS: \$31M (pension), \$123M (healthcare), \$154M (total)
- iii. Net impact on June 30, 2020 unfunded liabilities was **favorable**
 - a) \$166M less than expected (PERS) and \$15M less than expected (TRS)

The FY20 experience is summarized in the table below (in \$millions):

FY20 experience (gain)/loss	PERS	TRS
1. Market Value of Assets	\$556	\$274
2. Actuarial Value of Assets	275	139
3. Liabilities	<u>(441)</u>	<u>(154)</u>
4. Overall [(2) + (3)]	\$(166)	\$ (15)

Based on the June 30, 2020 valuation baseline projections, the Additional State Contributions are summarized in the table below (in \$millions)¹:

Additional State Contributions	PERS	TRS
1. FY23	\$ 196	\$ 146
2. FY24+	<u>4,078</u>	<u>3,118</u>
3. Total [(1) + (2)]	\$ 4,274	\$ 3,264

¹ The projections provided in September 2020 were based on the 2019 valuation data and reflected a *preliminary* FY20 market asset return of approximately 2.9%. The 2020 valuation projections reflect a *final* FY20 market asset return of approximately 4.1% and the FY20 liability gains. As a result, the 2020 valuation projections produce lower Additional State Contributions compared to the September 2020 projections. A detailed comparison of the two sets of projections is provided on slides 16 (PERS) and 19 (TRS). Figures may differ from slides 16 and 19 due to rounding.

Background

The annual actuarial valuations represent a snapshot measurement of the assets and liabilities as of the valuation date. Projected benefits are generated for each year in the future for current plan participants using the economic and demographic assumptions the ARMB adopted in 2019 based on the 2017 experience study. The **liabilities** (Actuarial Accrued Liability) represent the present value of the projected benefits at the valuation date, discounted at the assumed investment return of 7.38%, and allocated to past and future periods using the Entry Age Normal actuarial cost method. The **assets** (Actuarial Value of Assets) are based on the June 30, 2020 market values, adjusted by market gains and losses during each of the last four years (these market gains and losses are recognized in the Actuarial Value of Assets at a rate of 20% per year).

For each valuation, we determine *expected* assets, liabilities and other figures based on the prior year's valuation and the assumed experience for the current year. These expected values are compared to the *actual* values that are based on the current year's participant data and assets. The differences between the expected and actual values are the **actuarial gains and losses** (gains are generated when experience is *favorable* to the plan, losses are generated when experience is *unfavorable* to the plan). Under the 25-year layered amortization method the ARMB adopted effective for the June 30, 2018 valuations, each year's net gain or loss is amortized (funded) over a closed 25-year period that begins when the gain or loss is generated. The amortization amounts are assumed to remain level as a percentage of payroll. Payroll is expected to grow at a rate of 2.75% per year (with a stable active plan population overall), so the amortization amounts are expected to increase each year in the future.

There are four broad categories of actuarial gains/losses:

i. Assets

If assets earn more than the expected return of 7.38% during the plan year, we have a market **gain**. If the return is less than 7.38%, we have a market **loss**. The process for calculating the Actuarial Value of Assets and asset gains/losses is described below:

- a. The *expected* Actuarial Value as of the valuation date is calculated by projecting the prior year's Actuarial Value of Assets, plus expected return (7.38%), and adjusted for the cash flows (contributions, benefits, administrative expenses) that occurred during the year. Each cash flow includes an interest adjustment to the valuation date based on the timing of the cash flow.
- b. The *actual* Actuarial Value of Assets equals the market value as of the valuation date, adjusted by 20% of the market gain/loss that occurred in each of the last four years.
- c. If the actual value exceeds the expected value, we have an asset *gain*.
- d. If the expected value exceeds the actual value, we have an asset *loss*.

ii. Liabilities

Liability gains/losses are generated each year based on what happened to the participant data during the year compared to what we expected to happen based on the actuarial assumptions. For example, if actual salary increases during the year were less than expected, we have a liability **gain**; if people live longer than we expected (i.e., there were fewer deaths than expected), we have a liability **loss**. The process for calculating the liability gains/losses is described below:

- a. The *expected* Actuarial Accrued Liability as of the valuation date is calculated by projecting the prior year's Actuarial Accrued Liability, plus expected benefit accruals during the year for active members, less benefits paid during the year. As with assets, the

cash flows include an interest adjustment to the valuation date based on the timing of each cash flow.

- b. The *actual* Actuarial Accrued Liability is determined based on the current year's participant data and actuarial assumptions used in the valuation.
 - c. If the actual value exceeds the expected value, we have a liability *loss*.
 - d. If the expected value exceeds the actual value, we have a liability *gain*.
 - e. The liability gains and losses are identified by various sub-categories (e.g., retirement experience different than expected, salary increases greater than or less than expected, etc). For a complex valuation of large plans like PERS and TRS, it is impossible to identify each source of gains and losses, so a "miscellaneous" category includes a collection of smaller gains and losses (including the effects of unexpected data changes that are typical each year).
- iii. Actual vs. Expected Contributions
- a. Contribution rates determined as of each valuation date are based on projected (expected) payroll for the upcoming fiscal year.
 - b. If actual contributions made during the year are more than expected, we have a contribution *gain*.
 - c. If actual contributions made during the year are less than expected, we have a contribution *loss*.
- iv. Administrative Expenses
- a. The Normal Cost (the cost associated with active members' expected benefit accruals during the year) includes a load for administrative expenses that are expected to be paid from the trust. The load is based on an average of actual administrative expenses paid from the trust in the last two years.
 - b. If actual administrative expenses paid from the trust during the year are greater than the Normal Cost load, we have an administrative expense *loss*.
 - c. If actual administrative expenses paid from the trust during the year are less than the Normal Cost load, we have an administrative expense *gain*.

The net gain/loss for the year is the sum of the gains/losses from (i) through (iv), and is amortized over a closed 25-year period that begins in the following fiscal year (e.g., the FY20 net gain/loss is amortized over 25 years beginning in FY21). These new amortization amounts are combined with the previous years' amortization "layers" to derive the total amortization amounts. All amortization amounts are calculated separately for pension and healthcare.

Meeting Materials

Our meeting materials include the following sections:

- i. High-level overview of June 30, 2020 valuation results for PERS and TRS [Slides 5-8]
- ii. Allocations of June 30, 2020 Healthcare Liabilities [Slides 10-11]
 - o The pie charts show liability allocations split between pre-Medicare and Medicare benefits as well as between medical and prescription drugs.
- iii. Three sets of multi-year projections:
 - o **Baseline** [Slides 13-19] – All future experience matches the assumptions used in the valuations.
 - o **Sensitivity** [Slides 21-35] – Adverse experience in FY21 and FY22 for two key risk factors (asset returns and medical/Rx costs) were modeled separately. We have illustrated the potential impact if (i) market returns in FY21 and FY22 are 5% rather than

the expected return of 7.38%, and (ii) FY21 and FY22 medical/Rx claims paid from the trusts are 5% higher than expected based on the 2020 valuation trend rates. These adverse effects were selected arbitrarily for illustration purposes only².

- **Historical** [Slides 37-53] (PERS only³) – Comparison of baseline projections from the 2015, 2018 and 2020 valuations. We have included graphs for the following items, each shown separately by Pension, Healthcare and Total:
 - Actuarial Accrued Liability
 - Actuarial Value of Assets
 - Unfunded Actuarial Accrued Liability
 - Contribution Rates as of valuation date (% of DB/DCR payroll)
 - DB/DCR Payroll (only one graph is provided since there is no difference between Pension and Healthcare)

Slides 51-53 show (i) the impact on contribution rates as of each valuation date due to gains and losses from the June 30, 2015 through June 30, 2020 valuations, and (ii) the corresponding estimated dollar impact on employer/State contributions based on projected DB/DCR payroll. The gains and losses are grouped into the following major categories:

- Asset Returns
- Salary Increases
- Medical/Rx Claims
- Demographic Experience
- Assumption/Method Changes
- Actual vs. Expected Contributions⁴

- iv. Appendix with detailed results by plan [slides 55-95]

Below is a more detailed discussion of the information shown on slides 6-8:

1. Assets

- a. The market return on assets during FY20 was approximately 4.1% for both PERS and TRS. Because the actual return was less than the 7.38% expected return, we have FY20 *market* asset **losses** of \$556M for PERS and \$274M for TRS.
- b. Under the 5-year asset smoothing method, 20% of the FY20 market loss is recognized in the June 30, 2020 Actuarial Value of Assets, with the remaining 80% to be recognized over the next 4 years (20% per year). Under the asset smoothing method, the June 30, 2020 Actuarial Value of Assets also includes recognition of 20% of the FY19 market loss, 20% of the FY18 market gain, 20% of the FY17 market gain, and 20% of the FY16 market loss.
- c. The less-than-expected market return in FY20 and the asset smoothing method combined to produce FY20 *actuarial* asset **losses** of \$275M for PERS and \$139M for TRS.

² Changes to other risk factors, or alternative adverse experience levels for the two risk factors that we identified, would generate different results. See Section 6 of the draft June 30, 2020 PERS/TRS valuation reports for details on the risk factors related to the funding of the plans.

³ Due to the number of graphs and charts in this section, we have provided historical figures for PERS only. The magnitude of the historical figures for TRS would be different, but the relative comparisons shown for PERS would be similar for TRS.

⁴ The large gain shown in the June 30, 2015 column was due to the \$1B Additional State Contribution to PERS in FY15.

- d. The total *deferred* market asset **losses** as of June 30, 2020 are \$420M for PERS and \$210M for TRS. These amounts will be recognized in the Actuarial Value of Assets over the next 4 years. Absent other offsetting gains, we expect the recognition of these deferred asset losses to increase future contribution rates.

2. Liabilities

- a. The plans experienced FY20 liability **gains** of \$441M for PERS and \$154M for TRS. These gains represent approximately 1.9% of the expected June 30, 2020 Actuarial Accrued Liability for PERS, and approximately 1.5% for TRS.
- b. The largest pension liability gains were primarily due to lower-than-expected inflation during FY20 (approximately 1.3% actual vs. 2.5% expected). This resulted in lower-than-expected salary, COLA and PRPA increases during FY20.
- c. The largest healthcare liability gain was due to lower-than-expected medical/Rx claims experience. See the "FY21 Claims Cost Development" handout from the December 2, 2020 meeting for additional details.
- d. Page 6 of the draft PERS and TRS June 30, 2020 valuation reports provide further details on the sources of liability gains and losses.

3. Impact on the June 30, 2020 Unfunded Liability

- a. PERS: \$166M less than expected
- b. TRS: \$15M less than expected

4. Impact on Projected Additional State Contributions

- a. In September 2020, we provided the Committee with projected Additional State Contributions that reflected FY20 asset market returns of approximately 2.9% (based on preliminary asset statements that were available at the time). Also, those projections were based on the June 30, 2019 valuation data, which did not reflect any liability gains after FY19.
- b. We have updated the Additional State Contribution projections that reflect (i) better FY20 asset returns than we had calculated in September 2020 (4.1% vs 2.9%), and (ii) the FY20 liability gains.
- c. The net result is **lower** projected Additional State Contributions compared to the projections we provided in September 2020.
 - i. FY23: Lower by approximately \$12M (\$7M PERS, \$5M TRS)
 - ii. After FY23: Lower by approximately \$371M (\$163M PERS, \$208M TRS)

Below is a more detailed discussion of the Sensitivity and Historical Comparison sections:

1. Sensitivity

The purpose of this analysis is to illustrate potential outcomes due to adverse experience in the first two years of the projection period. Other adverse experience scenarios would produce different results.

- a. 5% market return in FY21 and FY22 [Slides 22-27]

If the market returns in these years are 5% instead of 7.38%, the plans would incur market asset losses over the two years of approximately \$812M for PERS and \$391M for TRS. Under the 5-year asset smoothing method, these market losses will be recognized

20% per year. Absent future gains to offset these asset losses, higher contributions will be needed to make up for the asset losses.

Slide 24 shows the potential impact on PERS. By FY39, the pension funded ratio is projected to be 85.9% vs 88.9% in the baseline scenario, despite an extra \$630M in Additional State Contributions. By FY50, the pension funded ratio is approximately 98% in both scenarios.

Slide 27 shows a similar impact on TRS. By FY39, the pension funded ratio is projected to be 88.6% vs 92.6% in the baseline scenario, despite an extra \$357M in Additional State Contributions through that fiscal year⁵. By FY50, the pension funded ratio is approximately 100% in both scenarios.

The healthcare funded ratios are also lower due to lower asset returns, but still more than 100% funded throughout the projection period.

b. Healthcare trend rates are 5% higher in FY21 and FY22 [Slides 28-35]

If the actual trend rates for these years are 5% higher than expected, the projected healthcare liabilities would be approximately 10% higher than the baseline scenario.

Despite this adverse experience, the healthcare trusts are still expected to remain more than 100% funded throughout the projection period. Compared to the baseline projections, the projected healthcare funded ratios at the end of the 30-year projection period decline from 214.4% to 115.2% (PERS) and from 283.5% to 182.4% (TRS).

The total employer/State contribution rates for PERS and TRS are expected to increase because the healthcare Normal Cost rates increase. This leads to relatively small increases in Additional State Contributions (when compared to the increases we saw in the 5% asset return scenario). Because the healthcare trusts remain overfunded, these higher Additional State Contributions are assumed to be contributed to the pension trusts. This leads to very small changes in the pension funded ratios.

2. Historical Comparison

The purposes of this analysis are to (i) provide Committee members with insight into how and why the projections have changed over the last few years, and (ii) quantify the approximate effects of recent experience on Employer/State contributions.

We included plan experience from the June 30, 2015 through June 30, 2020 valuations. The graphs include the baseline valuation projections from the 2015, 2018 and 2020 valuations. The horizontal axis of each graph denotes each valuation date (each year from June 30, 2015 through June 30, 2020 is shown, with every 5 years shown for future years). The vertical axis depends on the measure being graphed (note: the scale of the vertical axis changes from graph to graph depending on the magnitude of each measure).

▪ Actuarial Accrued Liability [Slides 38-40]

The decline from the 2015 projections to the 2018 projections at June 30, 2018 includes the effects of (i) plan experience since June 30, 2015, and (ii) the effects of the experience study assumption changes and EGWP implementation.

⁵ An additional \$268M in Additional State Contribution are projected for FY40-FY49 due to the adverse asset experience.

The decline from the 2018 projections to the 2020 projections at June 30, 2020 includes the effects of plan experience since June 30, 2018.

At the end of the projection period (June 30, 2040), pension liabilities are fairly close to each other on all three projections, but the healthcare liabilities are projected to be much lower (2020 projection vs 2018 projection) due to recent favorable medical/Rx claims experience (which includes the change to a new administrator in 2019).

- Actuarial Value of Assets [Slides 41-43]

The differences between the three sets of projections are due to (i) recent asset experience that has been greater/less than expected, and (ii) the effects of liability gains/losses on the contributions. The change in expected return (from 8.00% to 7.38%) effective June 30, 2018 also had an impact.

- Unfunded Actuarial Accrued Liability [Slides 44-46]

The changes in projected Unfunded Actuarial Accrued Liability (UAAL) are a function of the changes in projected assets and liabilities described above. The healthcare UAAL was projected to hover around zero, but it is now projected to be significantly less than zero because recent healthcare experience and the new administrator have resulted in the healthcare trusts being more than 100% funded. The healthcare trusts are expected to remain overfunded as the surplus grows with interest.

- Employer/State Contribution Rates [Slides 47-49]

FY39 is the final year of the 25-year amortization of the large UAAL that existed in 2014, so the contribution rates decline significantly at that point.

The projected contribution rates also depend on projected payroll. As seen on slide 50, payroll was projected to be much higher under the 2015 projections, which partly explains why the contribution rates from the 2015 projections are generally lower on slides 47-49.

- DB/DCR Payroll [Slide 50]

Due to the change in assumptions effective June 30, 2018 and plan experience since June 30, 2015, there was a decline from the 2015 projections to the 2018 projections. The 2018 and 2020 projections are tracking fairly closely in the future.

Since contribution rates are expressed as a percentage of DB/DCR payroll, lower projected payroll figures result in an increase in contribution rates and Additional State Contributions (all other things being equal). The 2018 and 2020 projections reflect much lower projected payroll figures than the 2015 projections, which is a function of changes in active plan population and lower salary increase rates that were implemented effective June 30, 2018 based on the experience study.

Slides 51-53 illustrate the estimated impact on contribution rates and amounts as of June 30, 2015 through June 30, 2018 due to plan experience. Six major categories of gains and losses are included.

- As expected, asset experience has had a significant impact on contribution rates. In all six years, the plans experienced unfavorable asset returns (based on the Actuarial Value of Assets), which led to a 6-year total contribution increase of approximately \$125M.

- Favorable medical/Rx claims experience in all but one of the six years led to a decrease of approximately \$229M in contributions over the 6-year period.
- The effects of assumption and method changes (including the 25-year layered amortization method that was implemented effective June 30, 2018) increased the 6-year total contribution by approximately \$189M. About 2/3 of this increase was on the healthcare side, and includes annual updates to healthcare trend rates and the implementation of EGWP that was recognized effective June 30, 2018.
- The large decrease in contribution rates in the June 30, 2015 valuation was due to the \$1B Additional State Contribution that was made in FY15.

Detailed valuation results by plan are shown in the Appendix (slides 57-95). See slide 55 for a description of the graphs provided in the Appendix. Valuation results for PERS, TRS, PERS DCR and TRS DCR are the same as the preliminary valuation results that were presented at the December 2, 2020 meeting, and valuation results for JRS and NGNMRS have been added.



State of Alaska Retirement Systems

Presentation to ARMB Actuarial Committee

June 30, 2020 Valuation Results and Projections

March 17, 2021

Contents

	Slide
Overview of Valuation Results (PERS and TRS)	5-8
Healthcare 6/30/20 Liability Allocations (PERS and TRS)	10-11
Projections (PERS and TRS)	
- 2020 Valuation Baseline Projections	13-19
- Sensitivity Analysis	21-35
- Historical Comparison (PERS only)	37-53
Appendix (Detailed Valuation Results by Plan)	
- Background	55
- PERS	57-64
- TRS	66-73
- PERS DCR	75-80
- TRS DCR	82-87
- JRS	89-93
- NGNMRS	95
Actuarial Certification	97

Today's presenters



David Kershner
FSA, EA, FCA, MAAA
Lead Retirement Consultant



Scott Young
FSA, EA, FCA, MAAA
Lead Healthcare Consultant



Tonya Manning
FSA, EA, FCA, MAAA
US Wealth Practice Leader

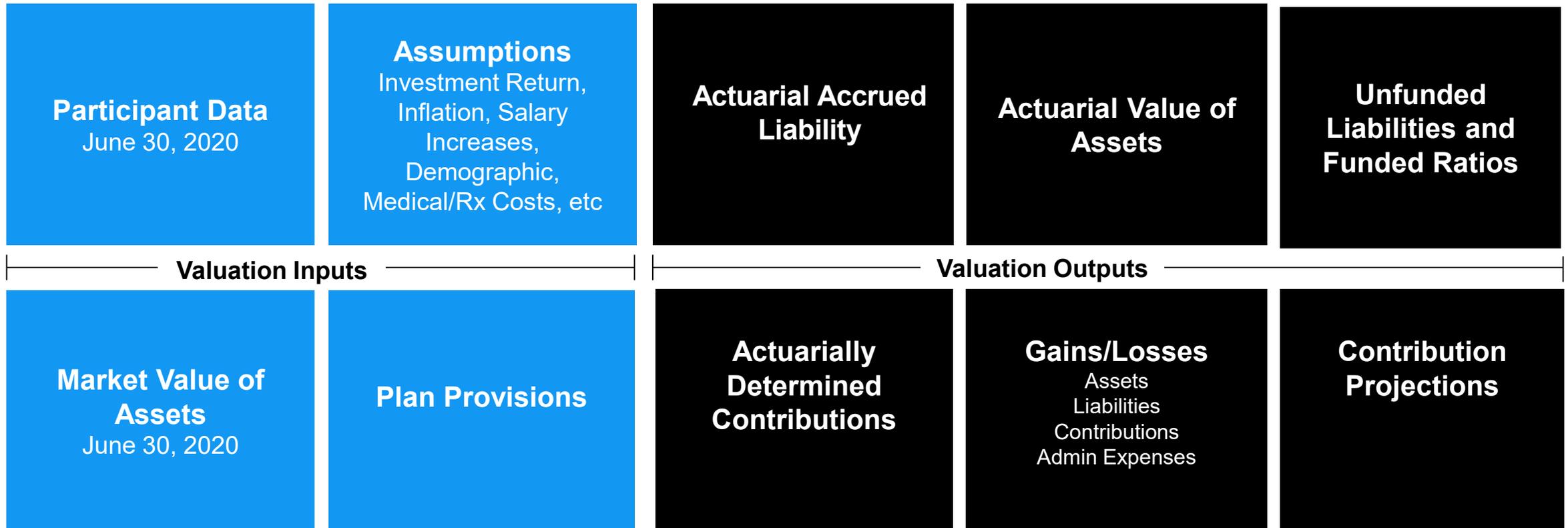


Ric Ford
FSA, CFA, EA, FCA, MAAA
Atlanta Wealth Practice Leader

Overview of Valuation Results (PERS and TRS)

Actuarial Valuation Process

- Snapshot measurement of the actuarial position of the plan at a given point in time
- Measures benefit obligation (liabilities) and compares it to existing plan assets
- Outputs are the Actuarially Determined Contributions and contribution projections
- Does not reflect the impact of future members or future plan changes



Executive Summary of 2020 Valuation Results (PERS & TRS)

Asset experience: *unfavorable*

FY20 market return was below 7.38% expected return

- **FY20 market asset losses**
 - PERS: \$556M
 - TRS: \$274M
- **FY20 smoothed (actuarial) asset losses***
 - PERS: \$275M
 - TRS: \$139M

Liability experience: *favorable*

Liability experience offset smoothed asset underperformance

- **PERS: \$441M gain**
 - Pension \$ 91M
 - Healthcare \$350M
- **TRS: \$154M gain**
 - Pension \$ 31M
 - Healthcare \$123M

Net result: *favorable*

Lower unfunded liabilities

- **PERS: \$166M lower**
- **TRS: \$15M lower**

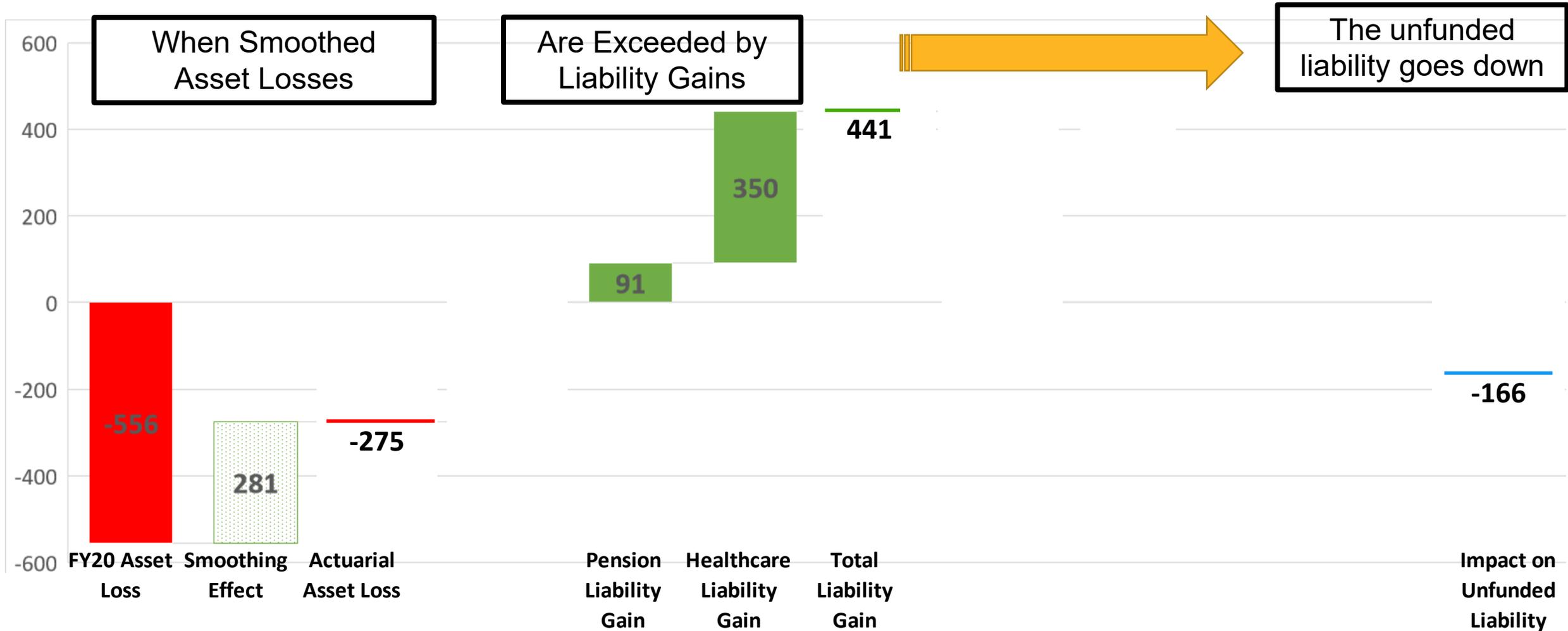
Projected Additional State Contributions

- **PERS:**
 - \$ 196M in FY23
 - \$4,078M in FY24+
- **TRS:**
 - \$ 146M in FY23
 - \$3,118M in FY24+

* Total deferred market asset losses as of June 30, 2020 are \$420M for PERS and \$210M for TRS. These deferred losses will be recognized over the next 4 years.

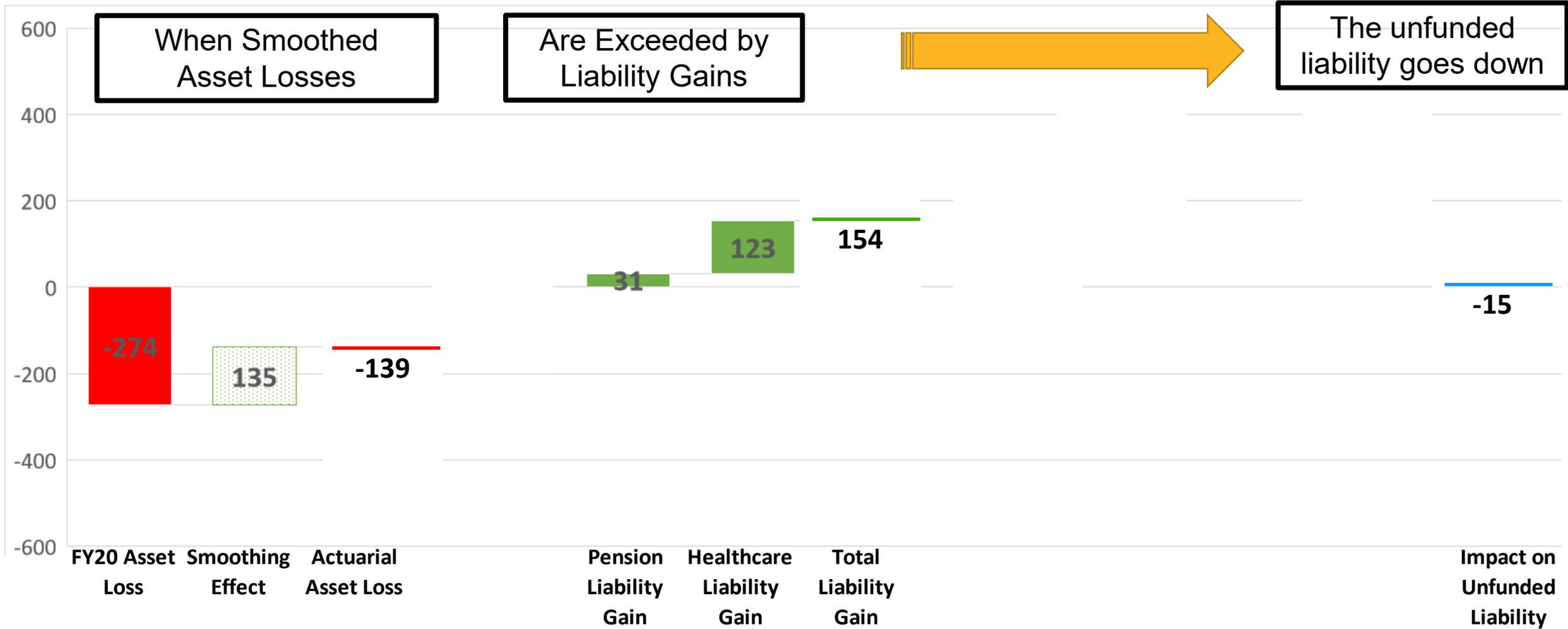
2020 Valuation Results – PERS

(\$millions)



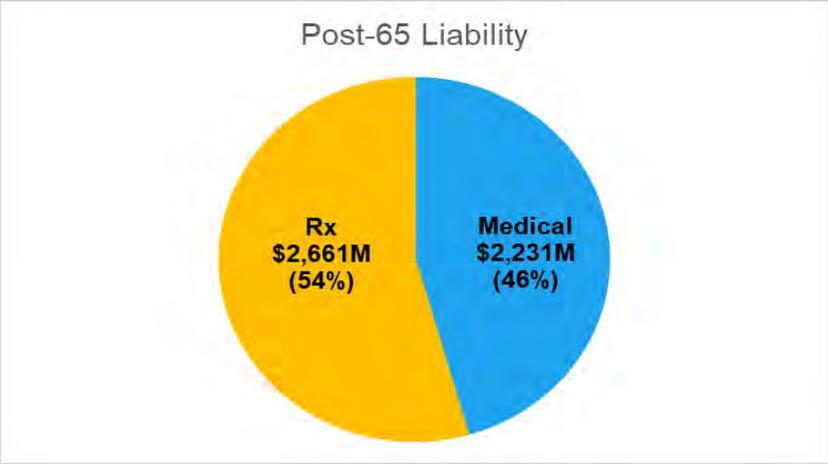
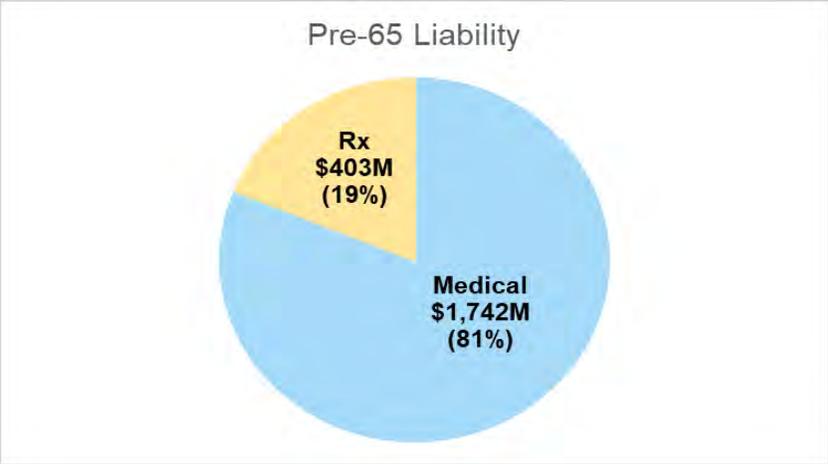
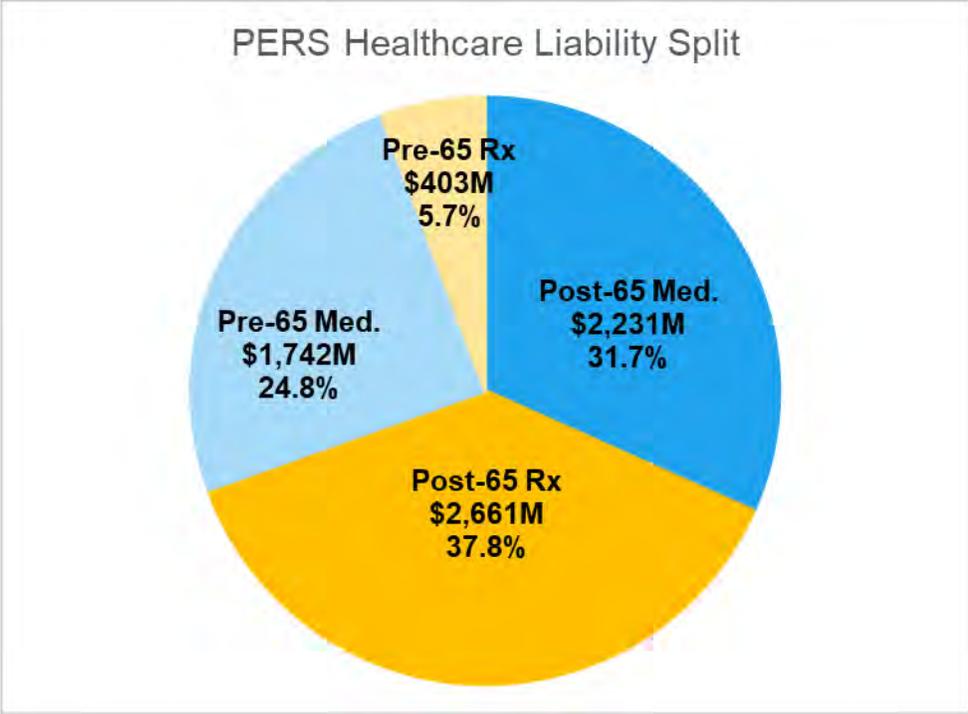
2020 Valuation Results – TRS

(\$millions)



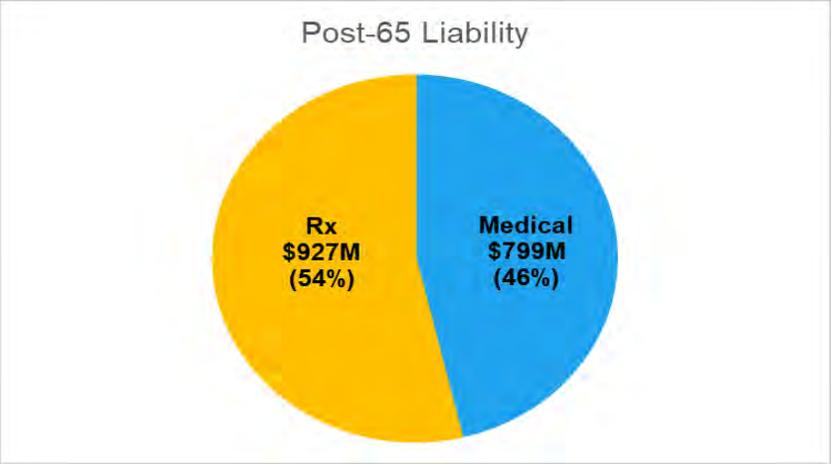
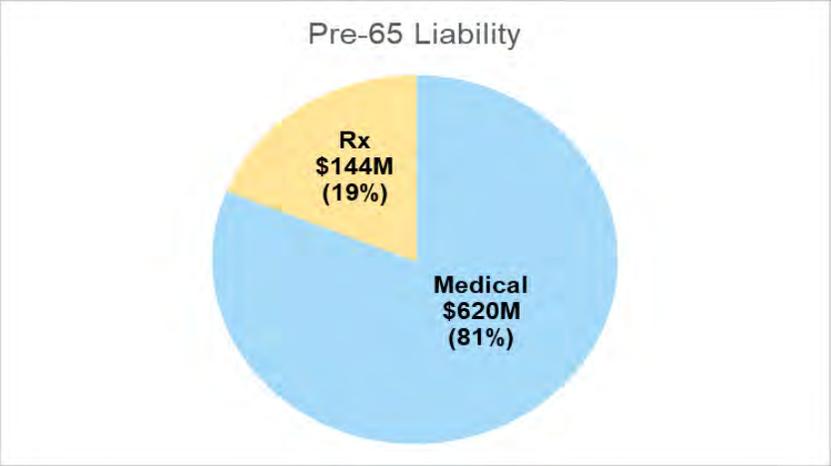
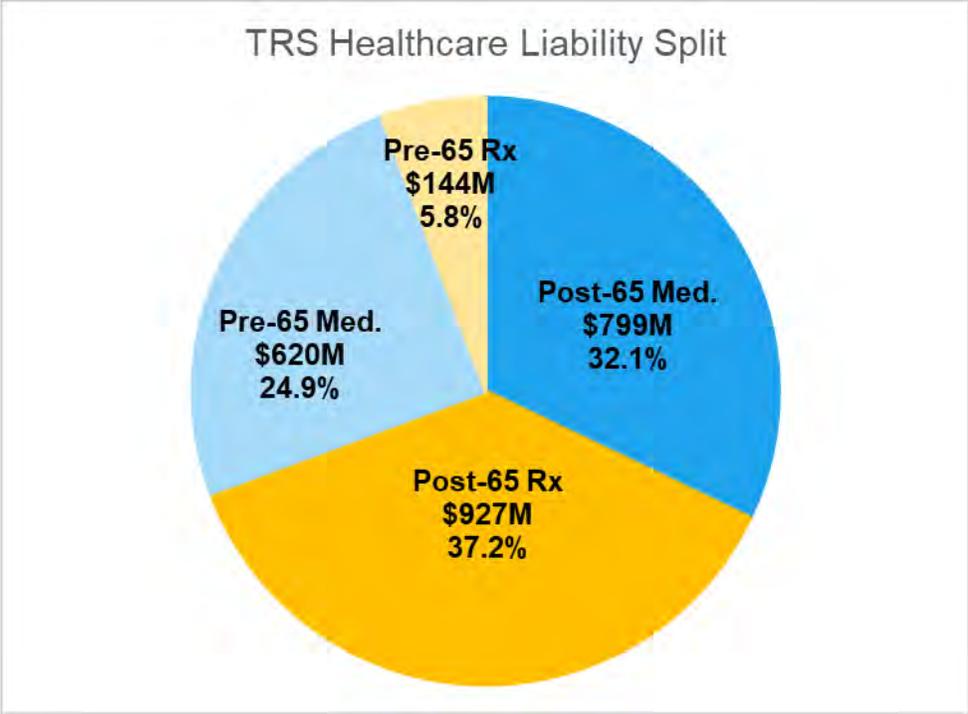
Healthcare Liability Allocations (PERS and TRS)

Healthcare 6/30/20 Liability Allocations - PERS



Note: Post-65 Rx liability shown is net of \$1,059M EGWP liability offset.

Healthcare 6/30/20 Liability Allocations - TRS



Note: Post-65 Rx liability shown is net of \$369M EGWP liability offset.

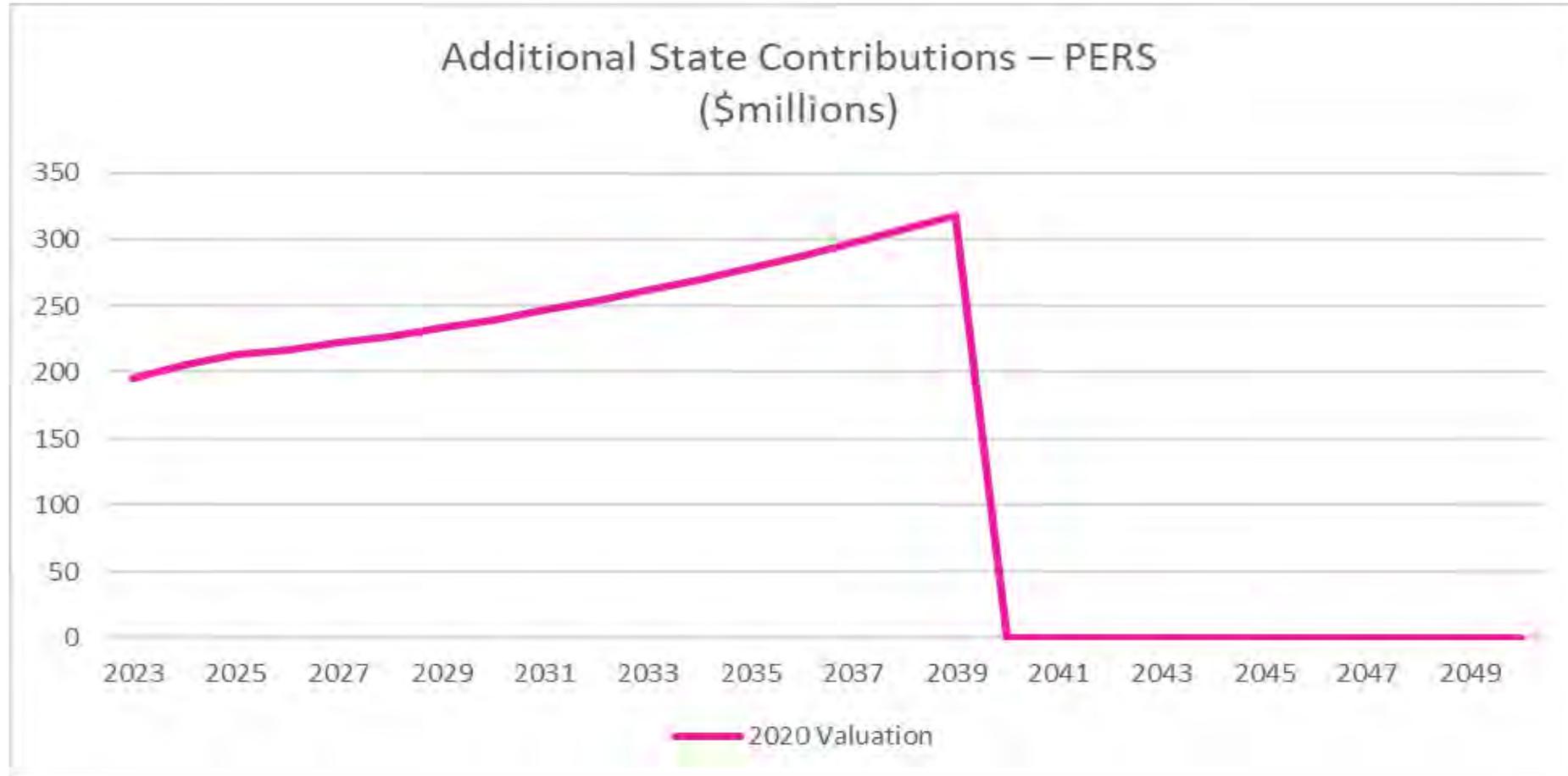
2020 Valuation Baseline Projections (PERS and TRS)

Baseline Projections* – Assumptions

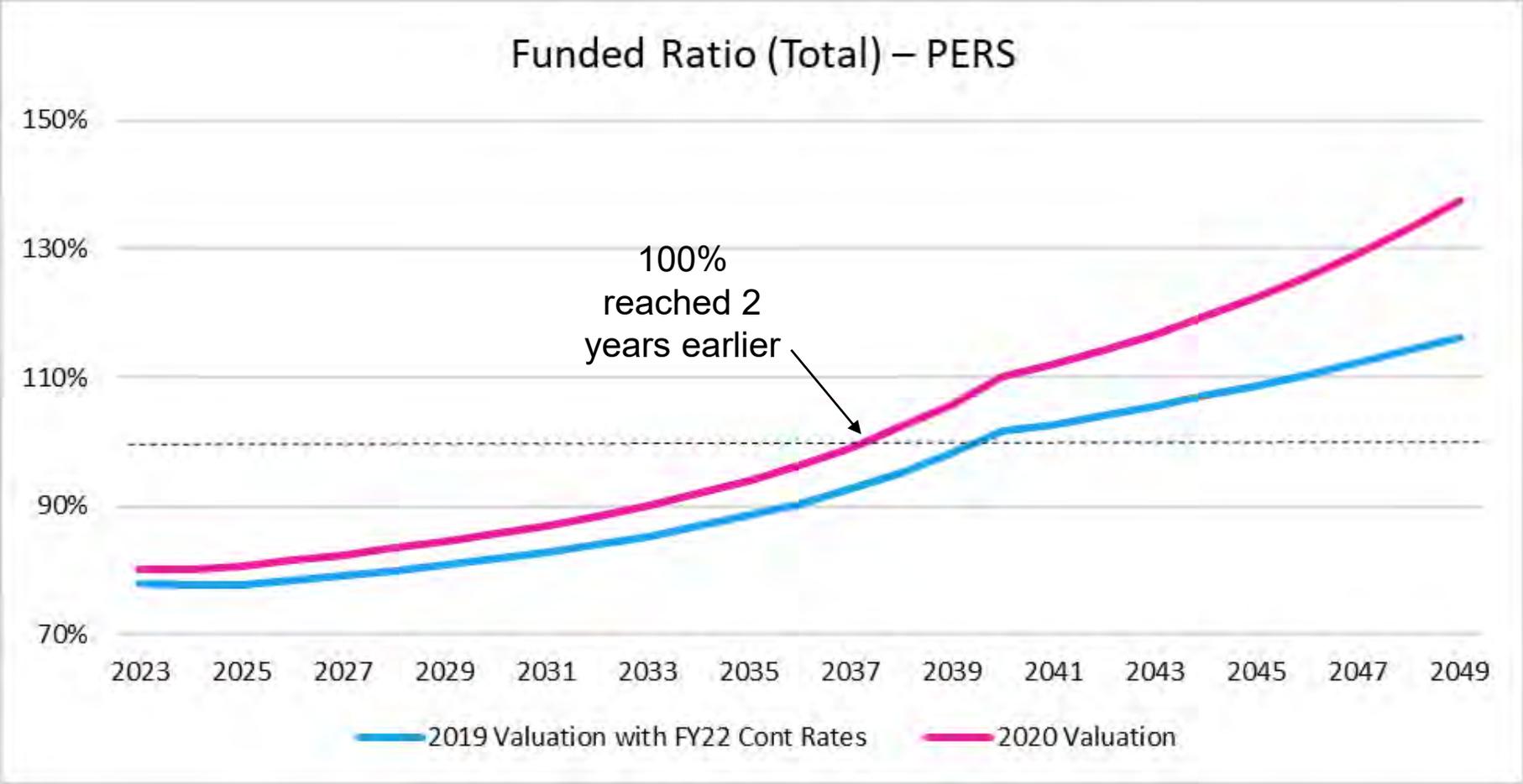
- All experience after 6/30/20 matches valuation assumptions
- 0% active plan population growth overall, all new hires enter the DCR plans
- DCR contribution rates as of 6/30/20 assumed to remain constant every year
- Active rehire assumption grades to zero uniformly over 20 years
- Normal Cost percentage load for administrative expenses assumed to remain constant
- Additional State Contributions allocated 100% to pension each year

* Projections reflect the FY22 contribution rates that were adopted by the ARMB in September 2020.

Additional State Contributions - PERS



Funded Ratio (Total) - PERS

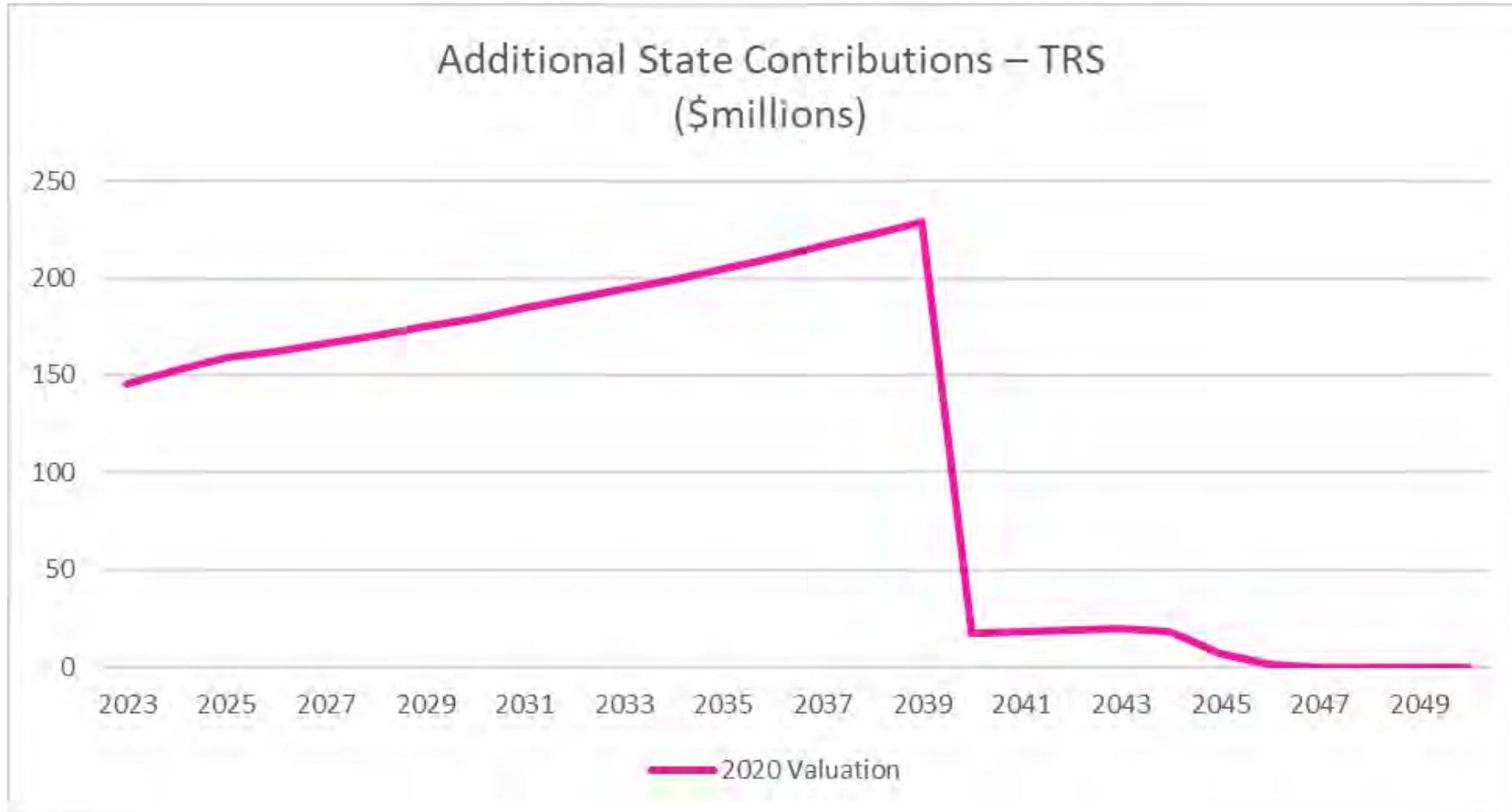


Projection Comparison – PERS

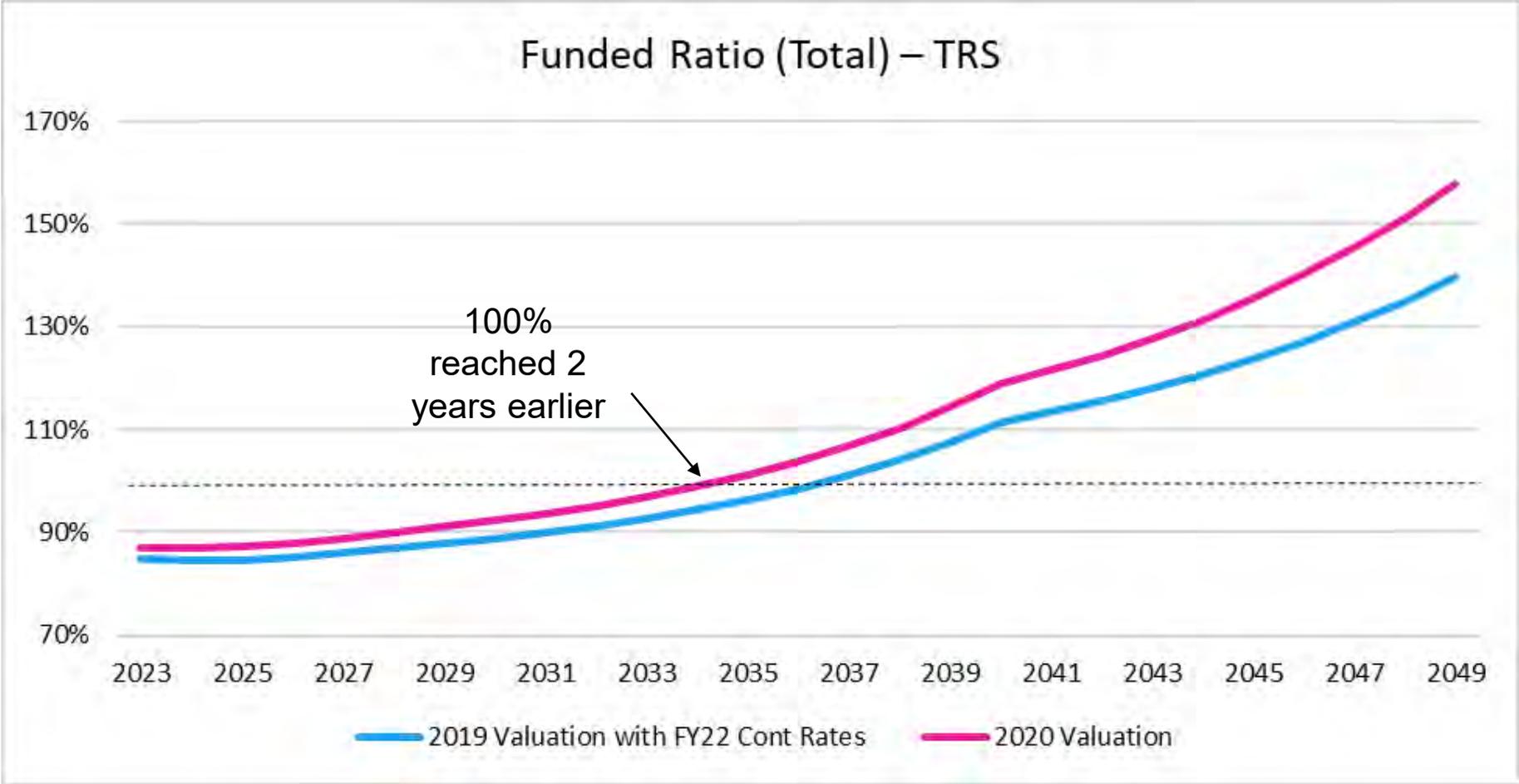
(\$000's)

Fiscal Year	Based on 2020 Valuation				Based on 2019 Valuation with FY22 Contribution Rates				Change in Additional State Cont
	Funded Ratio (AVA basis)			Additional State Cont	Funded Ratio (AVA basis)			Additional State Cont	
	Pension	Healthcare	Total		Pension	Healthcare	Total		
2023	64.5%	113.8%	80.2%	196,014	63.5%	107.4%	77.9%	203,510	(7,496)
2024	64.6%	113.5%	80.2%	205,353	63.5%	106.5%	77.6%	214,064	(8,711)
2025	65.0%	113.6%	80.6%	212,934	63.7%	106.0%	77.7%	223,183	(10,249)
2026	65.8%	114.4%	81.5%	217,230	64.5%	106.3%	78.4%	227,027	(9,797)
2027	66.6%	115.2%	82.4%	222,128	65.3%	106.7%	79.1%	231,409	(9,281)
2028	67.5%	116.2%	83.4%	227,103	66.2%	107.1%	80.0%	236,796	(9,693)
2029	68.4%	117.2%	84.5%	233,272	67.1%	107.6%	80.8%	242,807	(9,535)
2030	69.5%	118.4%	85.7%	239,495	68.1%	108.1%	81.8%	249,405	(9,910)
2031	70.6%	119.6%	87.0%	246,654	69.3%	108.7%	82.8%	256,223	(9,569)
2032	71.9%	121.1%	88.4%	253,868	70.6%	109.3%	84.0%	263,599	(9,731)
2033	73.4%	122.6%	90.1%	261,695	72.1%	110.0%	85.3%	271,880	(10,185)
2034	75.1%	124.4%	91.9%	269,842	73.8%	110.8%	86.8%	279,924	(10,082)
2035	77.1%	126.3%	94.0%	278,057	75.7%	111.6%	88.5%	288,620	(10,563)
2036	79.4%	128.5%	96.4%	287,481	78.1%	112.6%	90.4%	298,196	(10,715)
2037	82.1%	131.0%	99.1%	297,180	80.8%	113.7%	92.6%	308,277	(11,097)
2038	85.2%	133.8%	102.3%	307,514	84.0%	114.9%	95.2%	319,120	(11,606)
2039	88.9%	136.9%	105.9%	317,725	87.7%	116.3%	98.2%	329,816	(12,091)
2040	93.4%	140.5%	110.1%	0	92.2%	117.8%	101.6%	0	0
2041	93.9%	144.5%	112.0%	0	92.8%	119.6%	102.7%	0	0
2042	94.5%	149.1%	114.2%	0	93.5%	121.6%	104.0%	0	0
2043	95.3%	154.2%	116.7%	0	94.4%	123.8%	105.5%	0	0
2044	96.3%	160.1%	119.6%	0	95.6%	126.4%	107.2%	0	0
2045	96.9%	166.7%	122.5%	0	96.3%	129.3%	108.8%	0	0
2046	97.2%	174.1%	125.7%	0	96.8%	132.5%	110.5%	0	0
2047	97.5%	182.5%	129.2%	0	97.2%	136.2%	112.2%	0	0
2048	97.8%	192.0%	133.1%	0	97.6%	140.3%	114.2%	0	0
2049	98.1%	202.6%	137.6%	0	97.9%	144.9%	116.3%	0	0
2050	98.2%	214.4%	142.6%	0	n/a	n/a	n/a	n/a	0
Total				4,273,545				4,443,856	(170,311)

Additional State Contributions - TRS



Funded Ratio (Total) - TRS



Projection Comparison – TRS

(\$000's)

Fiscal Year	Based on 2020 Valuation				Based on 2019 Valuation with FY22 Contribution Rates				Change in Additional State Cont
	Funded Ratio (AVA basis)			Additional State Cont	Funded Ratio (AVA basis)			Additional State Cont	
	Pension	Healthcare	Total		Pension	Healthcare	Total		
2023	74.9%	122.0%	87.0%	145,601	73.9%	115.8%	85.0%	150,213	(4,612)
2024	74.5%	122.2%	86.9%	152,859	73.3%	115.3%	84.6%	158,325	(5,466)
2025	74.4%	122.6%	87.2%	158,813	73.1%	115.1%	84.5%	165,463	(6,650)
2026	74.9%	123.9%	88.0%	162,694	73.5%	116.0%	85.2%	169,613	(6,919)
2027	75.4%	125.3%	88.9%	166,575	74.0%	116.9%	86.0%	173,725	(7,150)
2028	75.9%	126.8%	89.9%	170,766	74.5%	117.9%	86.9%	178,166	(7,400)
2029	76.5%	128.5%	91.1%	175,032	75.1%	119.1%	87.8%	182,611	(7,579)
2030	77.2%	130.4%	92.3%	179,570	75.7%	120.4%	88.8%	187,538	(7,968)
2031	78.0%	132.6%	93.7%	184,399	76.5%	121.8%	90.0%	192,511	(8,112)
2032	78.9%	135.0%	95.2%	189,331	77.5%	123.4%	91.2%	197,650	(8,319)
2033	80.0%	137.6%	96.9%	194,428	78.6%	125.2%	92.7%	202,896	(8,468)
2034	81.3%	140.6%	98.9%	199,591	79.9%	127.2%	94.4%	208,501	(8,910)
2035	82.9%	144.0%	101.2%	205,075	81.4%	129.4%	96.3%	214,185	(9,110)
2036	84.7%	147.8%	103.8%	210,628	83.3%	131.9%	98.5%	219,936	(9,308)
2037	86.9%	152.0%	106.8%	216,515	85.5%	134.7%	101.1%	226,073	(9,558)
2038	89.5%	156.8%	110.3%	222,475	88.1%	137.8%	104.1%	232,385	(9,910)
2039	92.6%	162.1%	114.3%	228,679	91.3%	141.4%	107.5%	238,733	(10,054)
2040	96.3%	168.1%	118.9%	17,649	95.1%	145.3%	111.5%	28,043	(10,394)
2041	96.6%	174.9%	121.5%	18,300	95.4%	149.8%	113.4%	28,864	(10,564)
2042	96.9%	182.5%	124.3%	18,754	95.8%	154.8%	115.5%	29,706	(10,952)
2043	97.3%	191.1%	127.6%	19,444	96.3%	160.5%	117.9%	30,570	(11,126)
2044	97.7%	200.6%	131.4%	18,190	96.9%	166.7%	120.7%	29,588	(11,398)
2045	98.3%	211.1%	135.6%	6,649	97.7%	173.7%	123.8%	18,703	(12,054)
2046	98.7%	222.7%	140.2%	1,338	98.3%	181.4%	127.2%	7,866	(6,528)
2047	99.1%	235.5%	145.4%	0	98.8%	189.9%	130.9%	4,031	(4,031)
2048	99.5%	249.7%	151.2%	0	99.3%	199.3%	135.0%	0	0
2049	99.8%	265.7%	157.7%	0	99.7%	209.8%	139.6%	0	0
2050	99.9%	283.5%	164.9%	0	n/a	n/a	n/a	n/a	0
Total				3,263,355				3,475,895	(212,540)

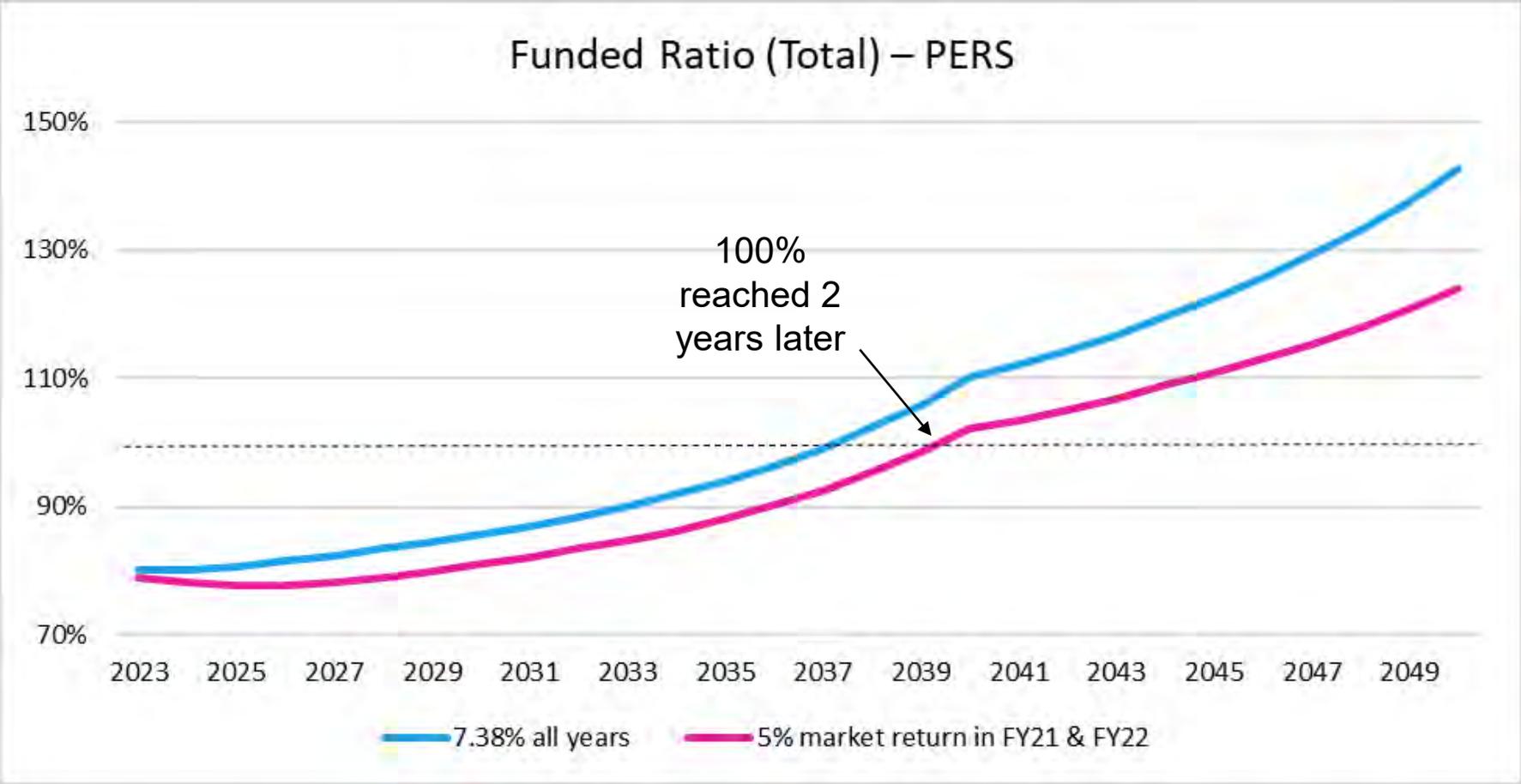
Sensitivity Analysis (PERS and TRS)

Sensitivity Analysis – 2020 Valuation Projections

- Two risk factors were changed to illustrate potential effects of adverse experience*
 - asset returns
 - medical/Rx costs
- Scenarios
 - Baseline: 7.38% return each year
 - Alternative 1: 5% market asset returns in FY21 and FY22, 7.38% each year thereafter
 - Alternative 2: Medical/Rx claims are 5% higher than expected in FY21 and FY22, expected trend thereafter

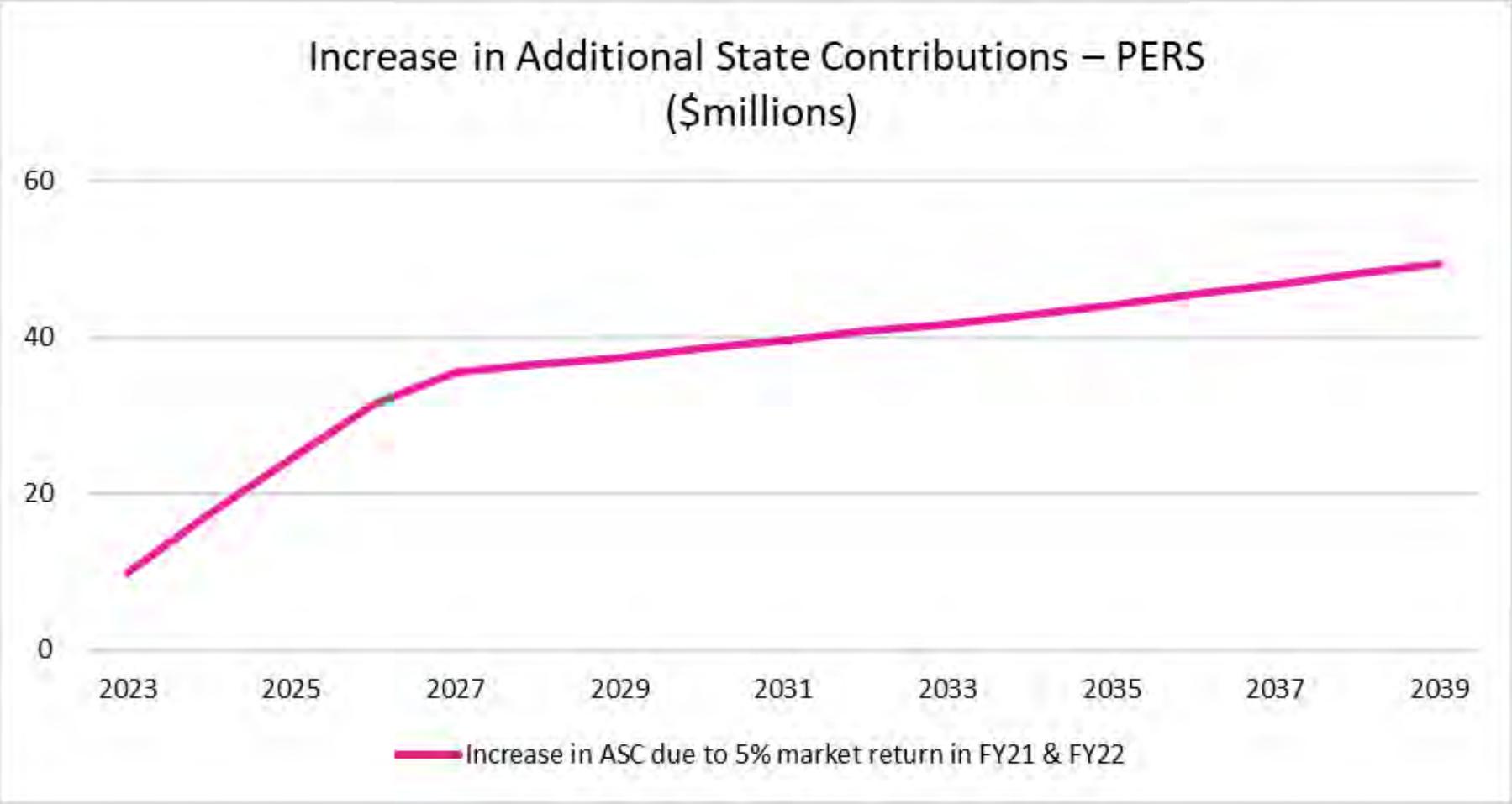
* See Section 6 of 6/30/20 valuation reports for discussion of these and other risk factors.

Baseline vs Alternative 1: Funded Ratio (Total) - PERS



Funded ratio lags behind as assets have to “catch up” due to lower investment earnings in FY21 and FY22

Increase in Additional State Contributions - PERS



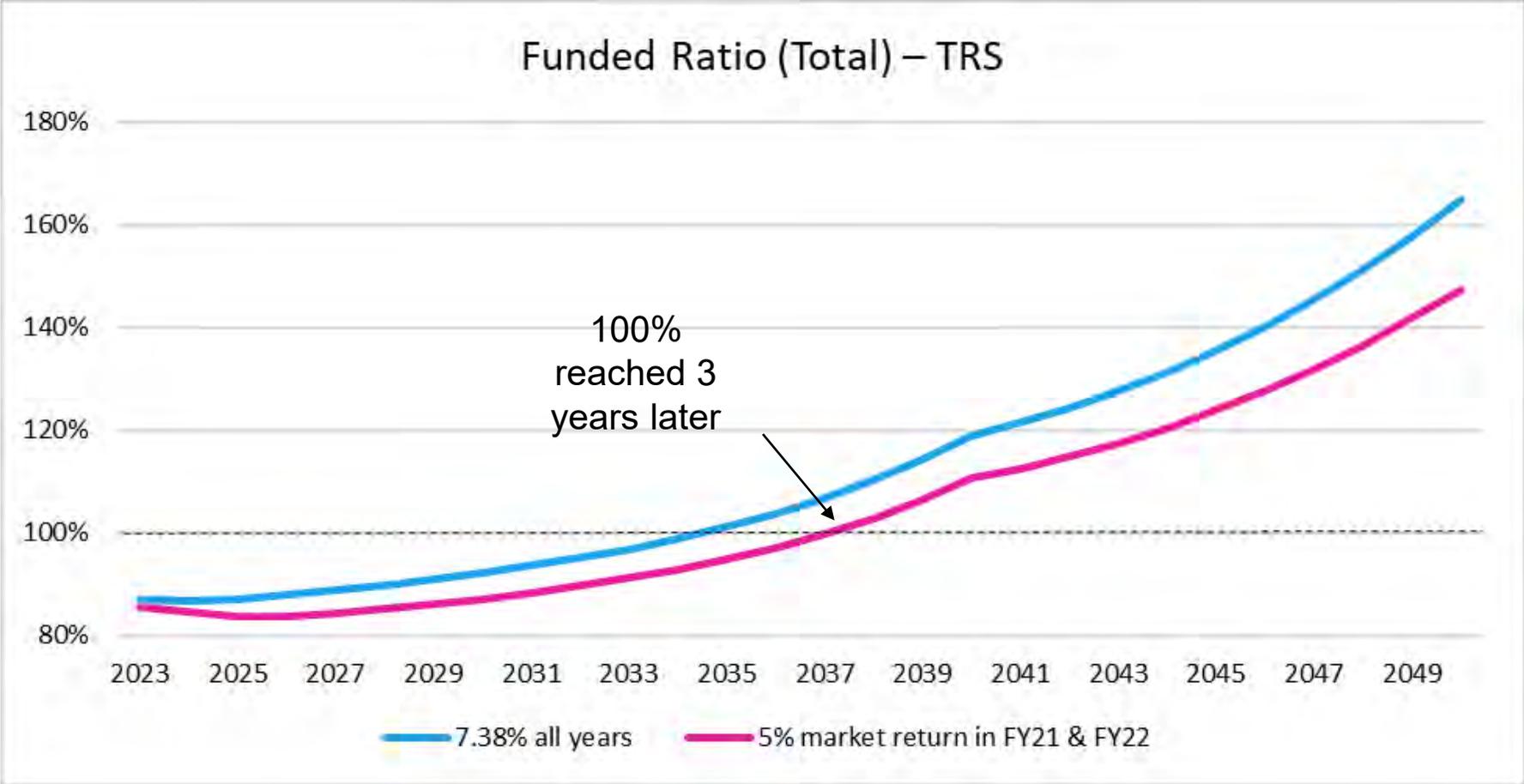
FY21 and FY22 asset losses totaling \$812M lead to a \$630M increase in Additional State Contributions (employer contributions also increase)

Impact of Adverse Asset Returns – PERS

(\$000's)

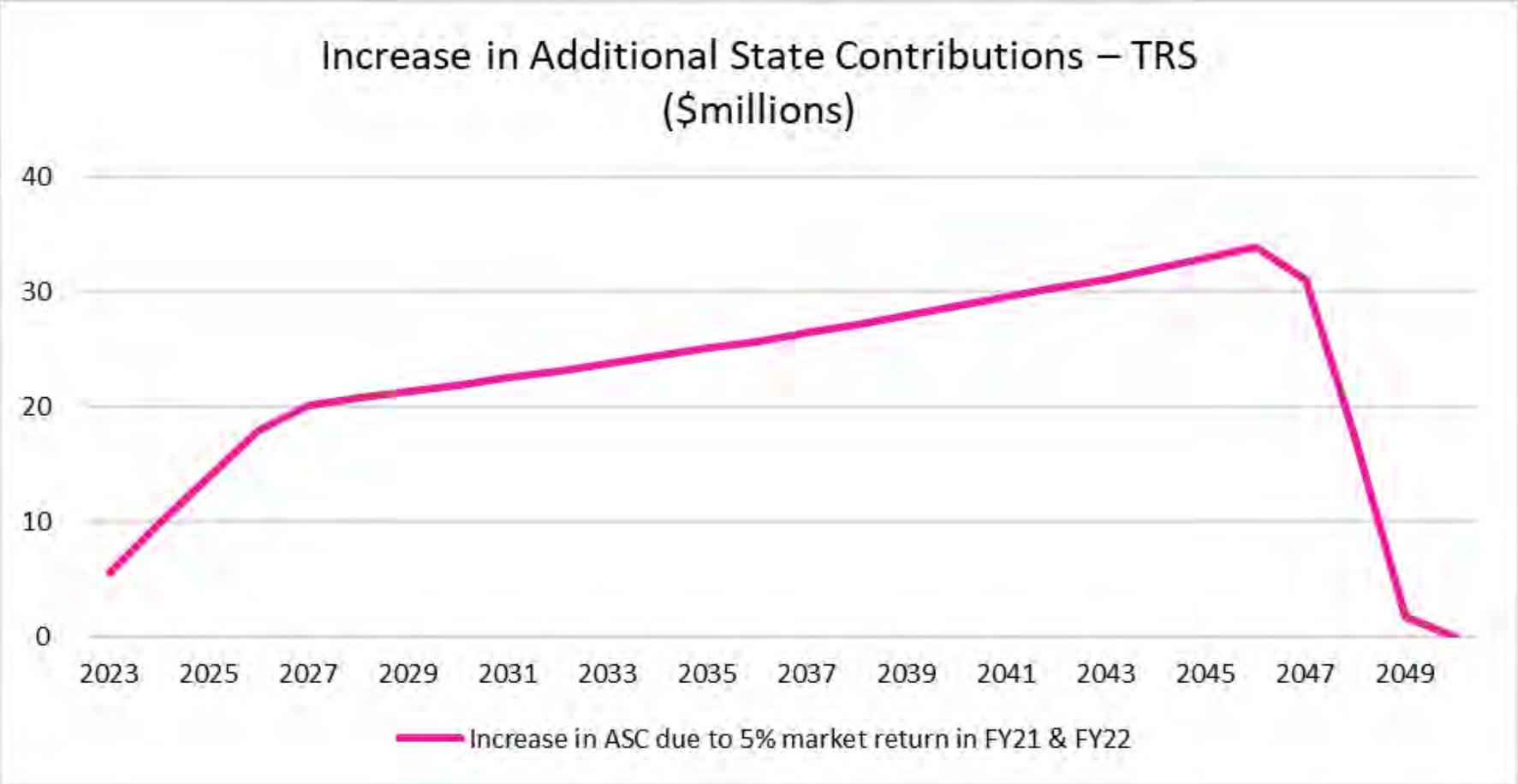
Fiscal Year	7.38% return each year				5% return in FY21 and FY22, 7.38% thereafter				Change in Additional State Cont
	Funded Ratio (AVA basis)			Additional State Cont	Funded Ratio (AVA basis)			Additional State Cont	
	Pension	Healthcare	Total		Pension	Healthcare	Total		
2023	64.5%	113.8%	80.2%	196,014	63.5%	112.1%	79.0%	205,875	9,861
2024	64.6%	113.5%	80.2%	205,353	63.0%	110.5%	78.2%	222,830	17,477
2025	65.0%	113.6%	80.6%	212,934	62.7%	109.3%	77.7%	237,465	24,531
2026	65.8%	114.4%	81.5%	217,230	62.9%	108.8%	77.7%	248,760	31,530
2027	66.6%	115.2%	82.4%	222,128	63.4%	108.8%	78.2%	257,638	35,510
2028	67.5%	116.2%	83.4%	227,103	64.3%	109.4%	79.0%	263,674	36,571
2029	68.4%	117.2%	84.5%	233,272	65.3%	110.0%	80.0%	270,720	37,448
2030	69.5%	118.4%	85.7%	239,495	66.3%	110.7%	81.0%	278,132	38,637
2031	70.6%	119.6%	87.0%	246,654	67.5%	111.4%	82.1%	286,281	39,627
2032	71.9%	121.1%	88.4%	253,868	68.8%	112.2%	83.4%	294,619	40,751
2033	73.4%	122.6%	90.1%	261,695	70.2%	113.1%	84.8%	303,341	41,646
2034	75.1%	124.4%	91.9%	269,842	72.0%	114.2%	86.3%	312,706	42,864
2035	77.1%	126.3%	94.0%	278,057	73.9%	115.3%	88.1%	322,193	44,136
2036	79.4%	128.5%	96.4%	287,481	76.2%	116.6%	90.2%	332,937	45,456
2037	82.1%	131.0%	99.1%	297,180	79.0%	118.0%	92.6%	343,989	46,809
2038	85.2%	133.8%	102.3%	307,514	82.2%	119.6%	95.3%	355,720	48,206
2039	88.9%	136.9%	105.9%	317,725	85.9%	121.5%	98.5%	367,077	49,352
2040	93.4%	140.5%	110.1%	0	90.4%	123.5%	102.2%	0	0
2041	93.9%	144.5%	112.0%	0	91.0%	125.9%	103.5%	0	0
2042	94.5%	149.1%	114.2%	0	91.8%	128.5%	105.0%	0	0
2043	95.3%	154.2%	116.7%	0	92.7%	131.5%	106.8%	0	0
2044	96.3%	160.1%	119.6%	0	93.9%	134.9%	108.9%	0	0
2045	96.9%	166.7%	122.5%	0	94.7%	138.7%	110.9%	0	0
2046	97.2%	174.1%	125.7%	0	95.3%	143.1%	113.0%	0	0
2047	97.5%	182.5%	129.2%	0	96.0%	147.9%	115.3%	0	0
2048	97.8%	192.0%	133.1%	0	96.7%	153.4%	118.0%	0	0
2049	98.1%	202.6%	137.6%	0	97.3%	159.6%	120.9%	0	0
2050	98.2%	214.4%	142.6%	0	97.7%	166.4%	123.9%	0	0
Total				4,273,545				4,903,957	630,412

Baseline vs Alternative 1: Funded Ratio (Total) - TRS



Funded ratio lags behind as assets have to “catch up” due to lower investment earnings in FY21 and FY22

Increase in Additional State Contributions - TRS



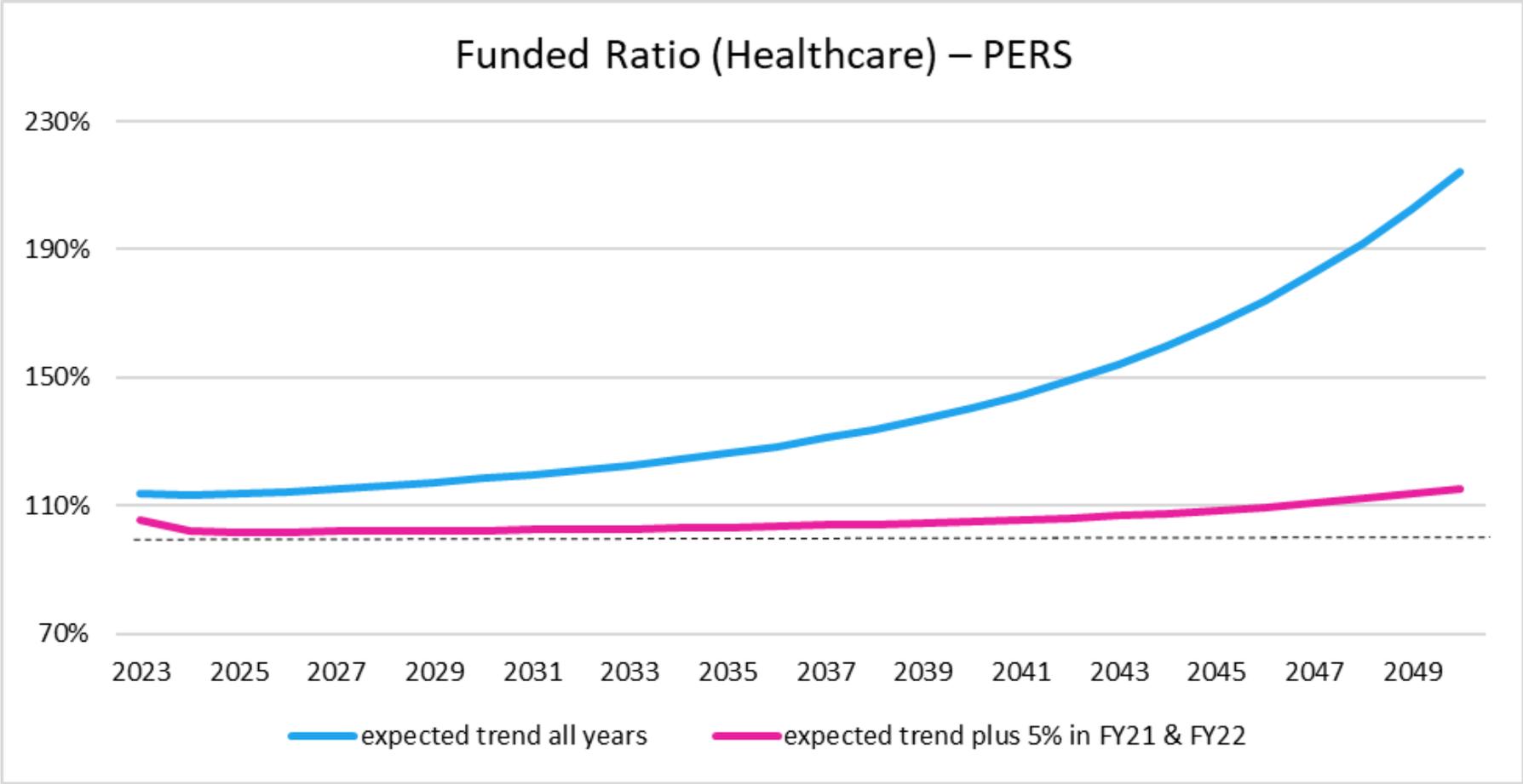
FY21 and FY22 asset losses totaling \$391M lead to a \$625M increase in Additional State Contributions (employer contributions also increase)

Impact of Adverse Asset Returns – TRS

(\$'000's)

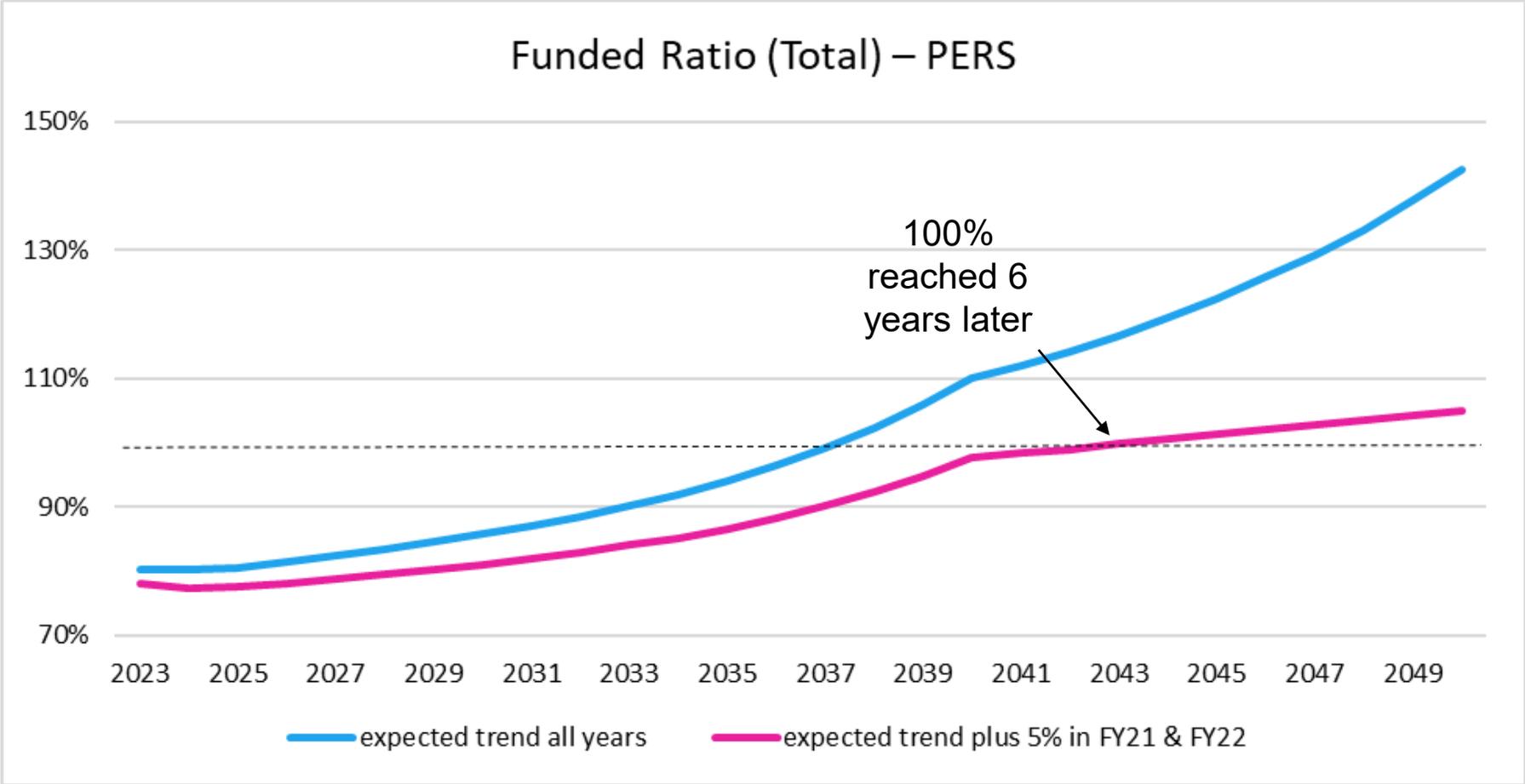
Fiscal Year	7.38% return each year				5% return in FY21 and FY22, 7.38% thereafter				Change in Additional State Cont
	Funded Ratio (AVA basis)			Additional State Cont	Funded Ratio (AVA basis)			Additional State Cont	
	Pension	Healthcare	Total		Pension	Healthcare	Total		
2023	74.9%	122.0%	87.0%	145,601	73.8%	120.2%	85.7%	151,111	5,510
2024	74.5%	122.2%	86.9%	152,859	72.5%	119.0%	84.7%	162,708	9,849
2025	74.4%	122.6%	87.2%	158,813	71.7%	118.1%	83.9%	172,737	13,924
2026	74.9%	123.9%	88.0%	162,694	71.4%	118.0%	83.9%	180,658	17,964
2027	75.4%	125.3%	88.9%	166,575	71.5%	118.5%	84.3%	186,720	20,145
2028	75.9%	126.8%	89.9%	170,766	72.0%	119.7%	85.2%	191,484	20,718
2029	76.5%	128.5%	91.1%	175,032	72.6%	120.9%	86.1%	196,365	21,333
2030	77.2%	130.4%	92.3%	179,570	73.3%	122.3%	87.2%	201,471	21,901
2031	78.0%	132.6%	93.7%	184,399	74.0%	123.9%	88.3%	206,903	22,504
2032	78.9%	135.0%	95.2%	189,331	74.9%	125.7%	89.7%	212,397	23,066
2033	80.0%	137.6%	96.9%	194,428	76.0%	127.6%	91.2%	218,173	23,745
2034	81.3%	140.6%	98.9%	199,591	77.3%	129.8%	92.9%	223,958	24,367
2035	82.9%	144.0%	101.2%	205,075	78.8%	132.3%	94.9%	230,184	25,109
2036	84.7%	147.8%	103.8%	210,628	80.7%	135.1%	97.2%	236,324	25,696
2037	86.9%	152.0%	106.8%	216,515	82.9%	138.2%	99.8%	242,920	26,405
2038	89.5%	156.8%	110.3%	222,475	85.5%	141.7%	102.9%	249,608	27,133
2039	92.6%	162.1%	114.3%	228,679	88.6%	145.6%	106.4%	256,572	27,893
2040	96.3%	168.1%	118.9%	17,649	92.4%	150.0%	110.6%	46,329	28,680
2041	96.6%	174.9%	121.5%	18,300	92.8%	155.0%	112.6%	47,794	29,494
2042	96.9%	182.5%	124.3%	18,754	93.2%	160.6%	114.8%	49,092	30,338
2043	97.3%	191.1%	127.6%	19,444	93.8%	166.9%	117.5%	50,533	31,089
2044	97.7%	200.6%	131.4%	18,190	94.6%	173.8%	120.5%	50,166	31,976
2045	98.3%	211.1%	135.6%	6,649	95.5%	181.6%	123.9%	39,537	32,888
2046	98.7%	222.7%	140.2%	1,338	96.3%	190.1%	127.7%	35,165	33,827
2047	99.1%	235.5%	145.4%	0	97.2%	199.5%	131.9%	31,049	31,049
2048	99.5%	249.7%	151.2%	0	98.2%	209.9%	136.6%	17,120	17,120
2049	99.8%	265.7%	157.7%	0	99.0%	221.6%	141.8%	1,702	1,702
2050	99.9%	283.5%	164.9%	0	99.5%	234.8%	147.4%	0	0
Total				3,263,355				3,888,780	625,425

Baseline vs Alternative 2: Funded Ratio (Healthcare) - PERS



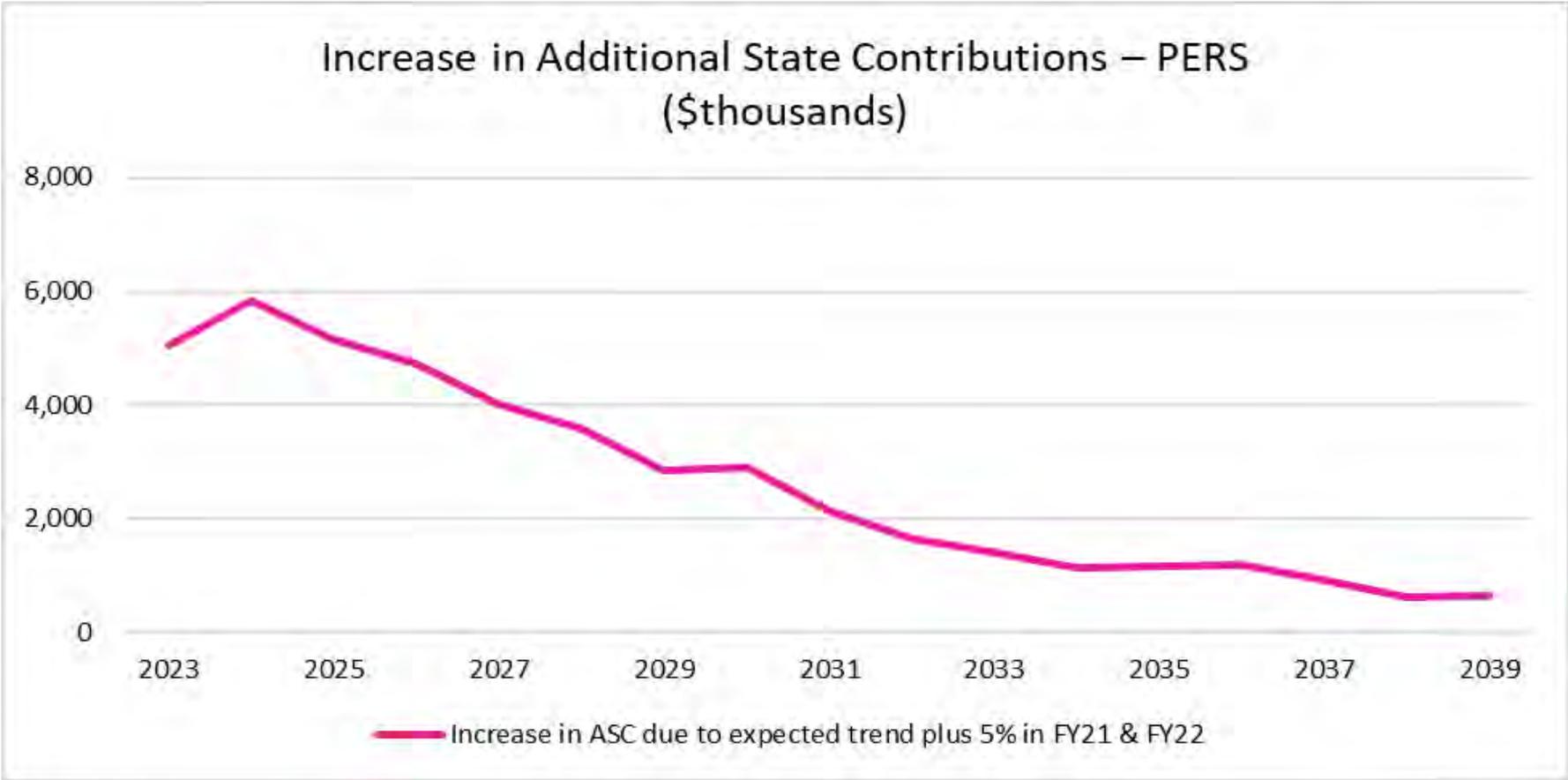
Healthcare funded ratio is still expected to remain above 100%, but not as high due to 10% higher Healthcare liabilities

Baseline vs Alternative 2: Funded Ratio (Total) - PERS



There is also a small effect on the Pension funded ratio because higher Additional State Contributions are deposited in the Pension trust

Increase in Additional State Contributions - PERS

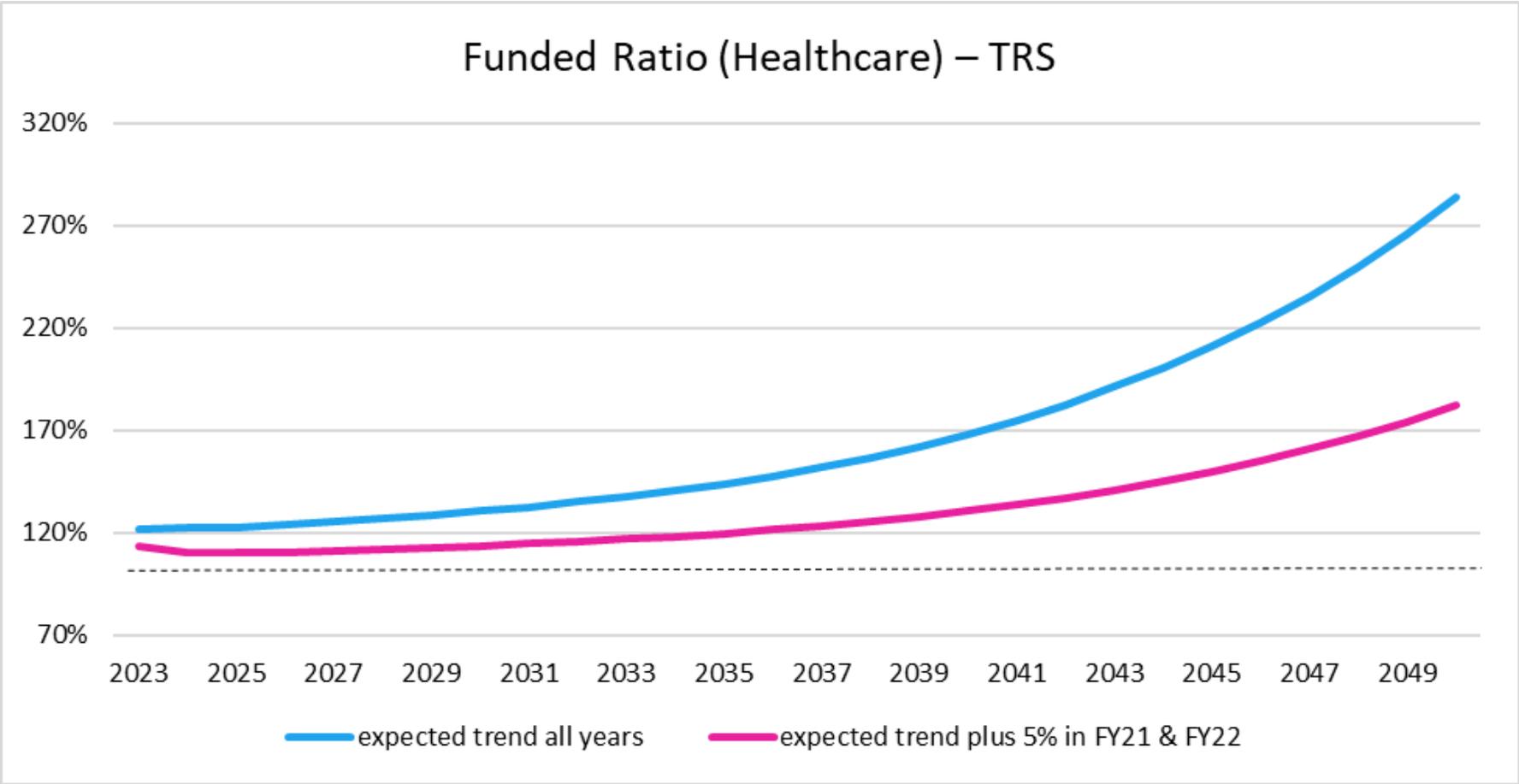


Impact of Adverse Medical/Rx Costs – PERS

(\$'000's)

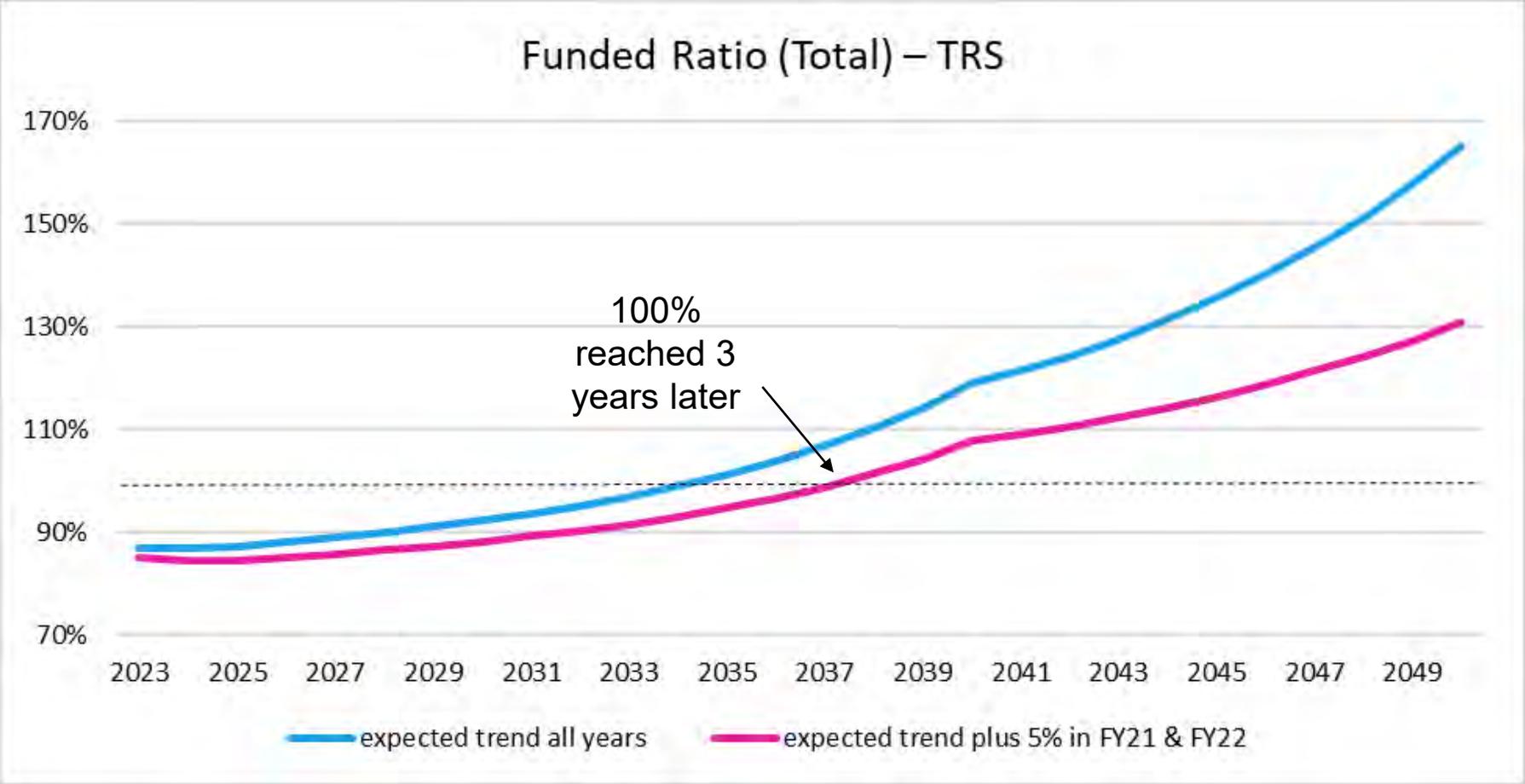
Fiscal Year	expected trend each year				expected trend plus 5% in FY21 and FY22				Change in Additional State Cont
	Funded Ratio (AVA basis)			Additional State Cont	Funded Ratio (AVA basis)			Additional State Cont	
	Pension	Healthcare	Total		Pension	Healthcare	Total		
2023	64.5%	113.8%	80.2%	196,014	64.5%	105.3%	78.1%	201,064	5,050
2024	64.6%	113.5%	80.2%	205,353	64.6%	102.2%	77.4%	211,179	5,826
2025	65.0%	113.6%	80.6%	212,934	65.0%	101.7%	77.5%	218,085	5,151
2026	65.8%	114.4%	81.5%	217,230	65.8%	101.8%	78.1%	221,947	4,717
2027	66.6%	115.2%	82.4%	222,128	66.6%	101.9%	78.8%	226,157	4,029
2028	67.5%	116.2%	83.4%	227,103	67.5%	102.0%	79.5%	230,683	3,580
2029	68.4%	117.2%	84.5%	233,272	68.4%	102.1%	80.2%	236,132	2,860
2030	69.5%	118.4%	85.7%	239,495	69.5%	102.3%	81.0%	242,406	2,911
2031	70.6%	119.6%	87.0%	246,654	70.6%	102.4%	81.9%	248,811	2,157
2032	71.9%	121.1%	88.4%	253,868	71.9%	102.6%	82.9%	255,520	1,652
2033	73.4%	122.6%	90.1%	261,695	73.4%	102.8%	84.0%	263,102	1,407
2034	75.1%	124.4%	91.9%	269,842	75.1%	103.0%	85.2%	270,993	1,151
2035	77.1%	126.3%	94.0%	278,057	77.1%	103.3%	86.6%	279,234	1,177
2036	79.4%	128.5%	96.4%	287,481	79.4%	103.6%	88.3%	288,685	1,204
2037	82.1%	131.0%	99.1%	297,180	82.1%	103.9%	90.1%	298,103	923
2038	85.2%	133.8%	102.3%	307,514	85.2%	104.3%	92.3%	308,144	630
2039	88.9%	136.9%	105.9%	317,725	89.0%	104.7%	94.8%	318,370	645
2040	93.4%	140.5%	110.1%	0	93.4%	105.1%	97.8%	0	0
2041	93.9%	144.5%	112.0%	0	93.9%	105.6%	98.3%	0	0
2042	94.5%	149.1%	114.2%	0	94.5%	106.2%	99.0%	0	0
2043	95.3%	154.2%	116.7%	0	95.3%	106.9%	99.8%	0	0
2044	96.3%	160.1%	119.6%	0	96.3%	107.6%	100.7%	0	0
2045	96.9%	166.7%	122.5%	0	96.9%	108.5%	101.4%	0	0
2046	97.2%	174.1%	125.7%	0	97.2%	109.4%	102.0%	0	0
2047	97.5%	182.5%	129.2%	0	97.5%	110.8%	102.8%	0	0
2048	97.8%	192.0%	133.1%	0	97.8%	112.2%	103.5%	0	0
2049	98.1%	202.6%	137.6%	0	98.1%	113.6%	104.3%	0	0
2050	98.2%	214.4%	142.6%	0	98.2%	115.2%	105.0%	0	0
Total				4,273,545				4,318,615	45,070

Baseline vs. Alternative 2: Funded Ratio (Healthcare) - TRS



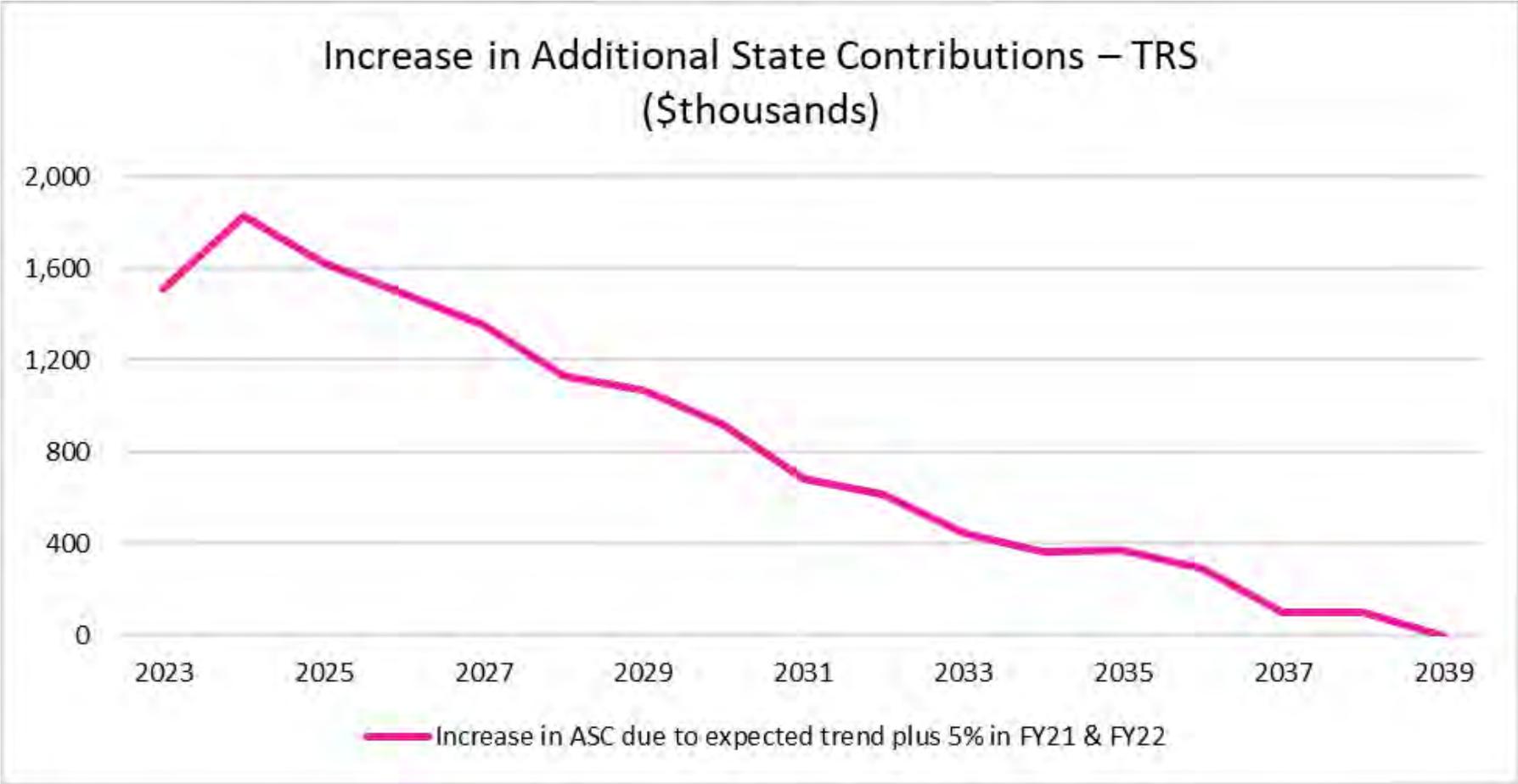
Healthcare funded ratio is still expected to remain above 100%, but not as high due to 10% higher Healthcare liabilities

Baseline vs Alternative 2: Funded Ratio (Total) - TRS



There is also a very small effect on the Pension funded ratio because higher Additional State Contributions are deposited in the Pension trust

Increase in Additional State Contributions - TRS



Impact of Adverse Medical/Rx Costs – TRS

(\$'000's)

Fiscal Year	expected trend each year				expected trend plus 5% in FY21 and FY22				Change in Additional State Cont
	Funded Ratio (AVA basis)			Additional State Cont	Funded Ratio (AVA basis)			Additional State Cont	
	Pension	Healthcare	Total		Pension	Healthcare	Total		
2023	74.9%	122.0%	87.0%	145,601	74.9%	113.1%	85.2%	147,111	1,510
2024	74.5%	122.2%	86.9%	152,859	74.5%	110.2%	84.4%	154,691	1,832
2025	74.4%	122.6%	87.2%	158,813	74.4%	110.0%	84.5%	160,437	1,624
2026	74.9%	123.9%	88.0%	162,694	74.9%	110.6%	85.1%	164,185	1,491
2027	75.4%	125.3%	88.9%	166,575	75.4%	111.2%	85.8%	167,928	1,353
2028	75.9%	126.8%	89.9%	170,766	75.9%	112.0%	86.5%	171,899	1,133
2029	76.5%	128.5%	91.1%	175,032	76.5%	112.7%	87.3%	176,103	1,071
2030	77.2%	130.4%	92.3%	179,570	77.2%	113.6%	88.2%	180,493	923
2031	78.0%	132.6%	93.7%	184,399	78.0%	114.6%	89.2%	185,083	684
2032	78.9%	135.0%	95.2%	189,331	78.9%	115.7%	90.3%	189,943	612
2033	80.0%	137.6%	96.9%	194,428	80.0%	116.9%	91.6%	194,874	446
2034	81.3%	140.6%	98.9%	199,591	81.3%	118.2%	93.0%	199,956	365
2035	82.9%	144.0%	101.2%	205,075	82.9%	119.7%	94.7%	205,448	373
2036	84.7%	147.8%	103.8%	210,628	84.7%	121.4%	96.6%	210,915	287
2037	86.9%	152.0%	106.8%	216,515	86.9%	123.3%	98.8%	216,613	98
2038	89.5%	156.8%	110.3%	222,475	89.5%	125.5%	101.3%	222,575	100
2039	92.6%	162.1%	114.3%	228,679	92.6%	127.9%	104.3%	228,679	0
2040	96.3%	168.1%	118.9%	17,649	96.3%	130.5%	107.8%	17,754	105
2041	96.6%	174.9%	121.5%	18,300	96.6%	133.6%	109.1%	18,407	107
2042	96.9%	182.5%	124.3%	18,754	96.9%	137.0%	110.6%	18,865	111
2043	97.3%	191.1%	127.6%	19,444	97.3%	140.9%	112.3%	19,444	0
2044	97.7%	200.6%	131.4%	18,190	97.8%	145.1%	114.2%	18,190	0
2045	98.3%	211.1%	135.6%	6,649	98.3%	149.8%	116.4%	6,530	(119)
2046	98.7%	222.7%	140.2%	1,338	98.7%	155.0%	118.7%	1,217	(121)
2047	99.1%	235.5%	145.4%	0	99.1%	160.8%	121.3%	0	0
2048	99.5%	249.7%	151.2%	0	99.5%	167.2%	124.2%	0	0
2049	99.8%	265.7%	157.7%	0	99.8%	174.3%	127.3%	0	0
2050	99.9%	283.5%	164.9%	0	99.9%	182.4%	130.8%	0	0
Total				3,263,355				3,277,340	13,985

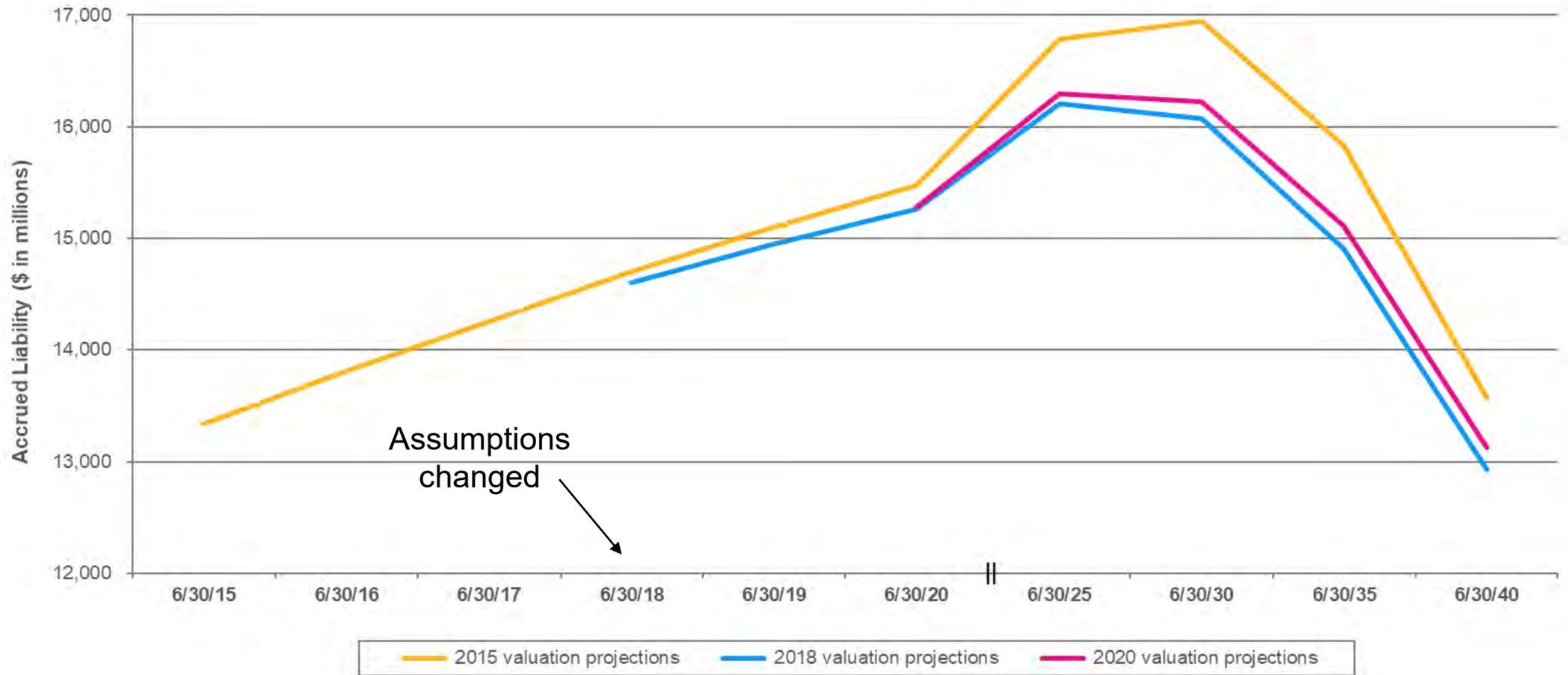
Historical Comparison (PERS only)

PERS Historical Comparison

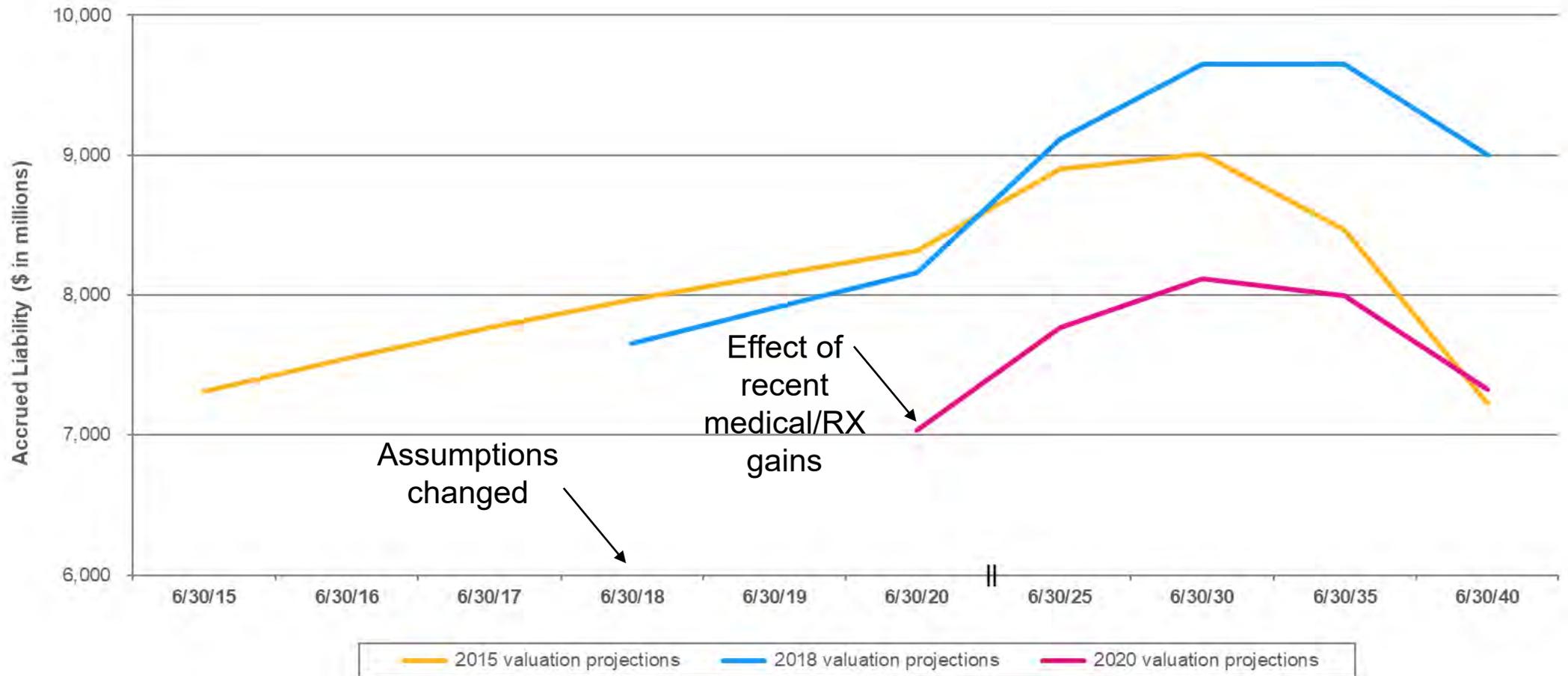
- Comparison of baseline projections from the 2015, 2018 and 2020 valuations on these measures:
 - Actuarial Accrued Liability
 - Actuarial Value of Assets
 - Unfunded Actuarial Accrued Liability
 - Contribution Rates as of each valuation date (as % of DB/DCR payroll)
 - DB/DCR payroll
- Impact of experience on contribution rates and amounts for these (gain)/loss categories:
 - asset returns
 - salary increases
 - medical/Rx claims
 - demographic experience
 - assumption/method changes
 - actual vs expected contributions*

* The \$1B Additional State Contribution made in FY15 is reason for large decrease in contribution rate as of 6/30/15.

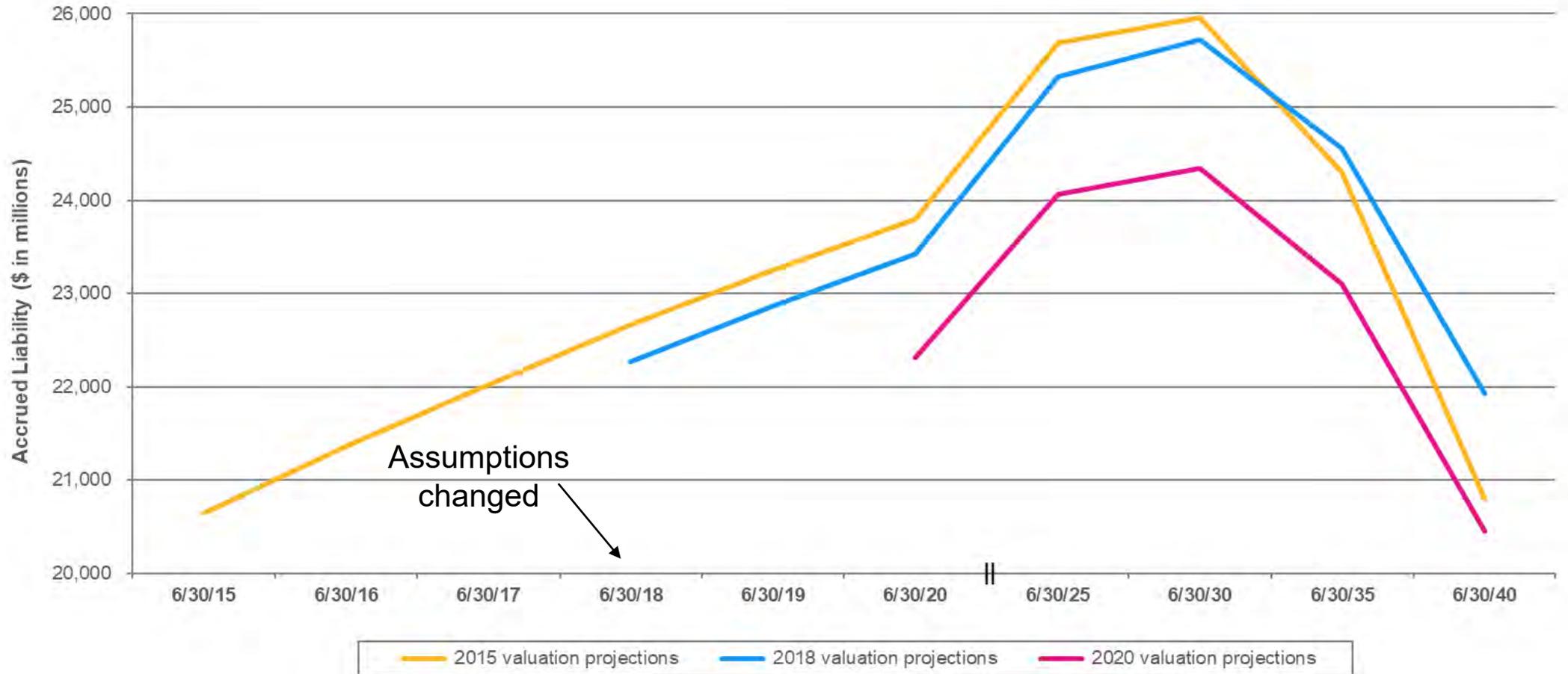
Actuarial Accrued Liability – PERS Pension



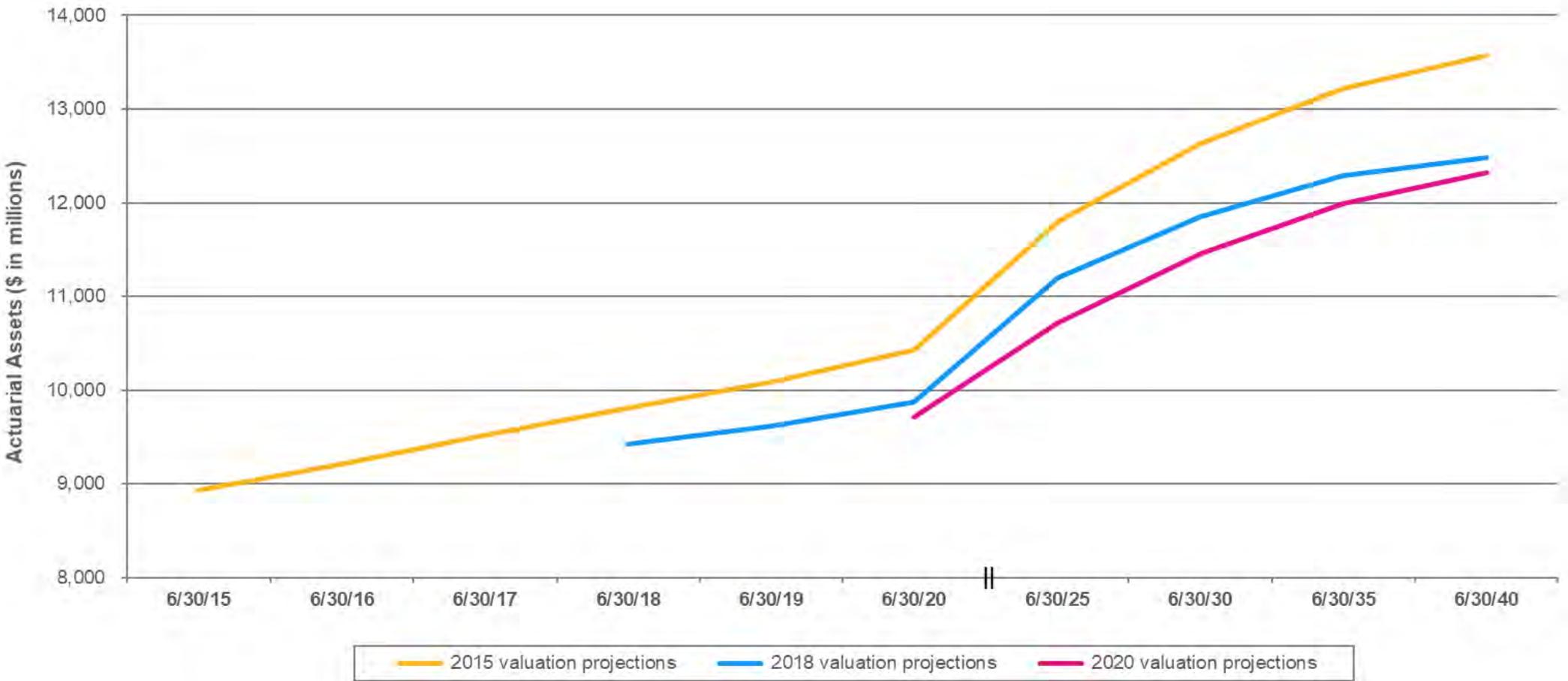
Actuarial Accrued Liability – PERS Healthcare



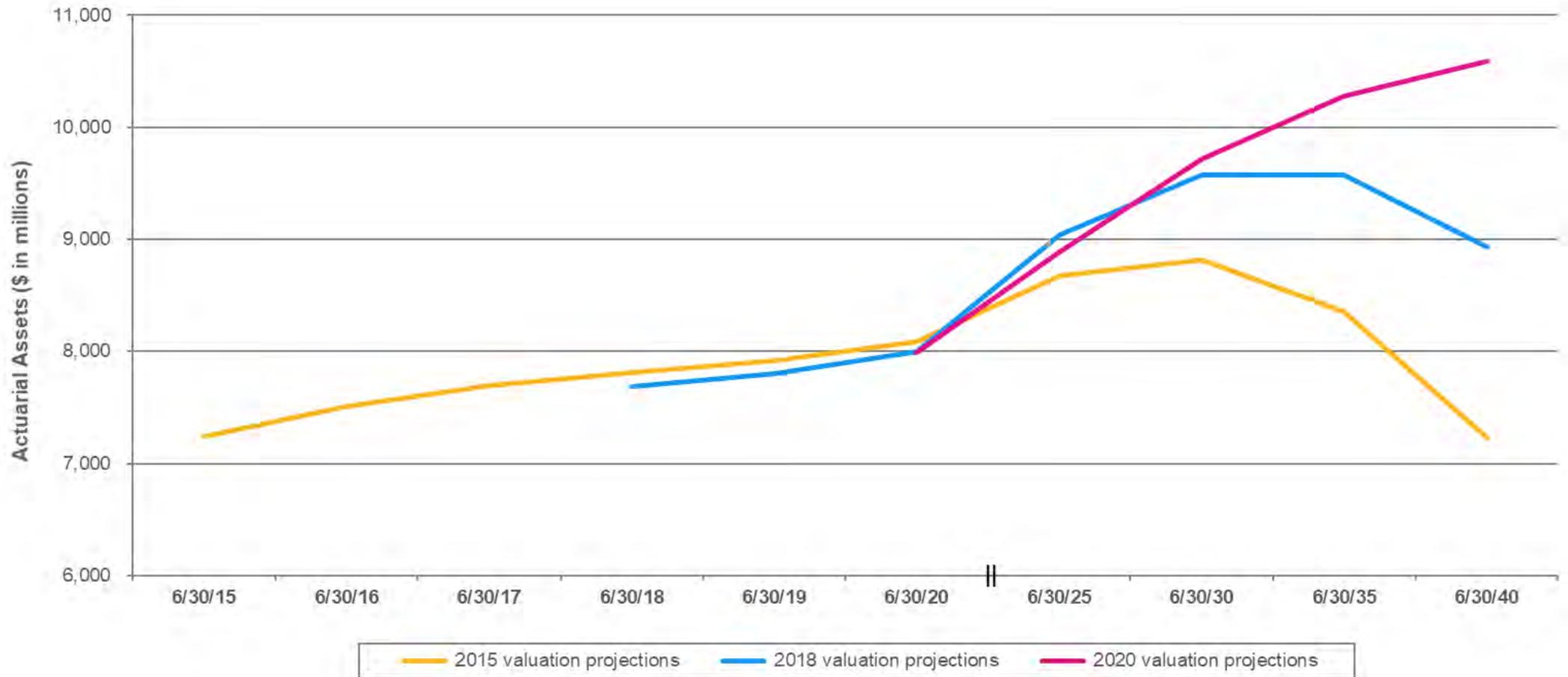
Actuarial Accrued Liability – PERS Total



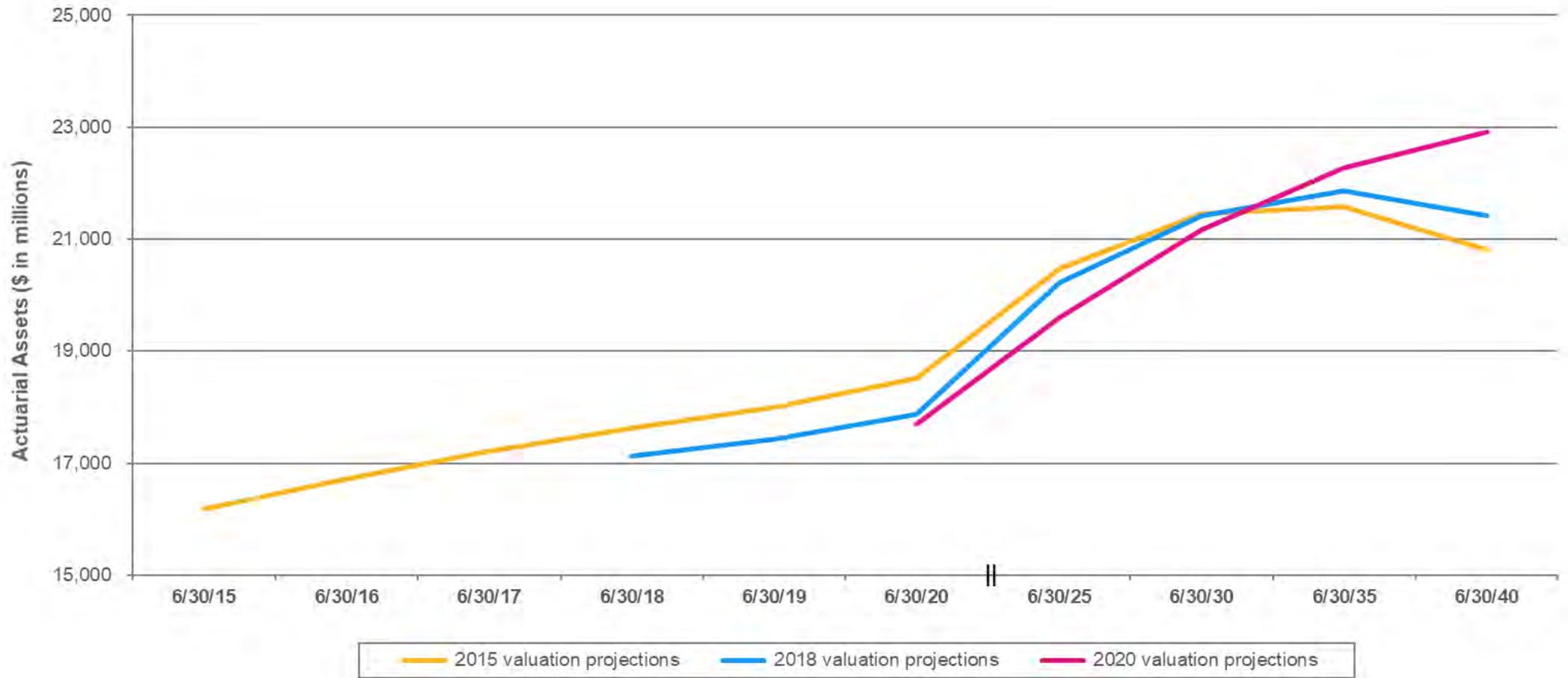
Actuarial Value of Assets – PERS Pension



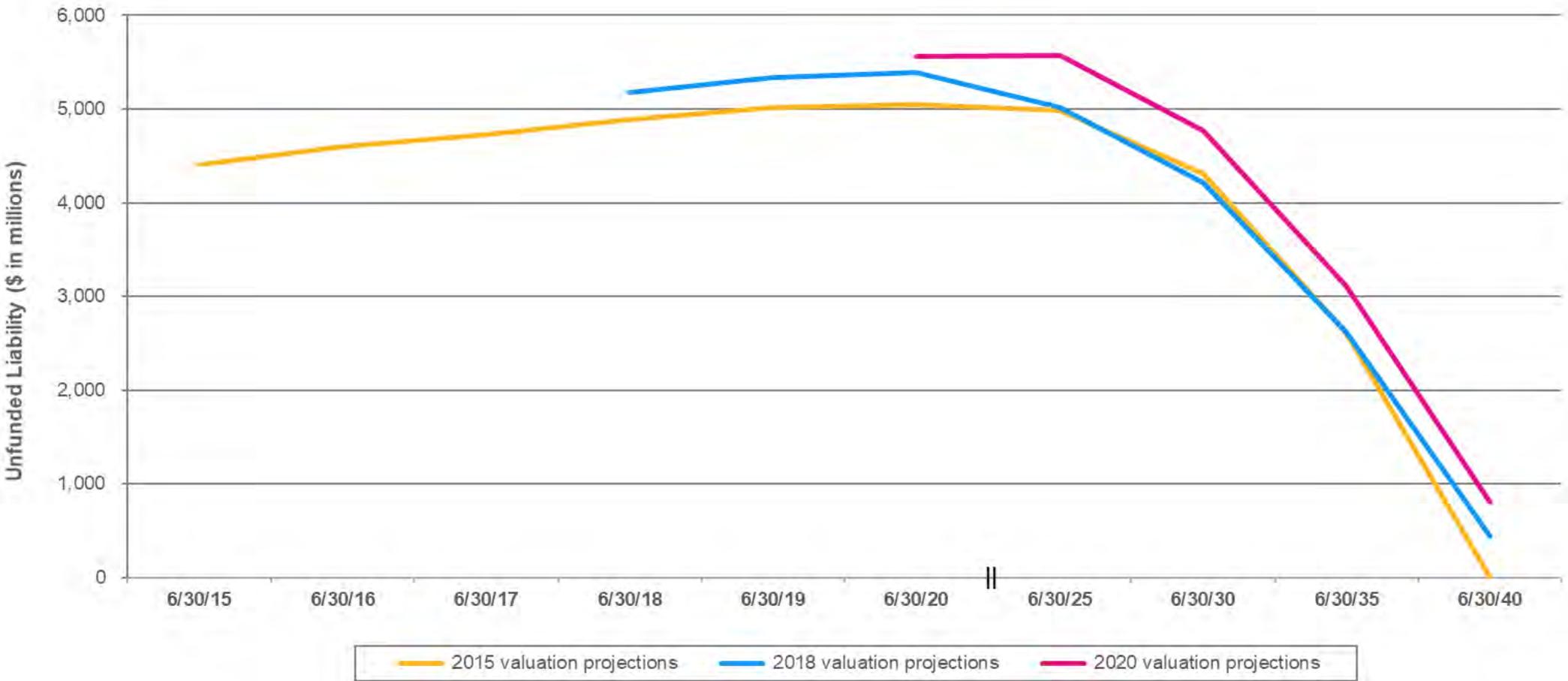
Actuarial Value of Assets – PERS Healthcare



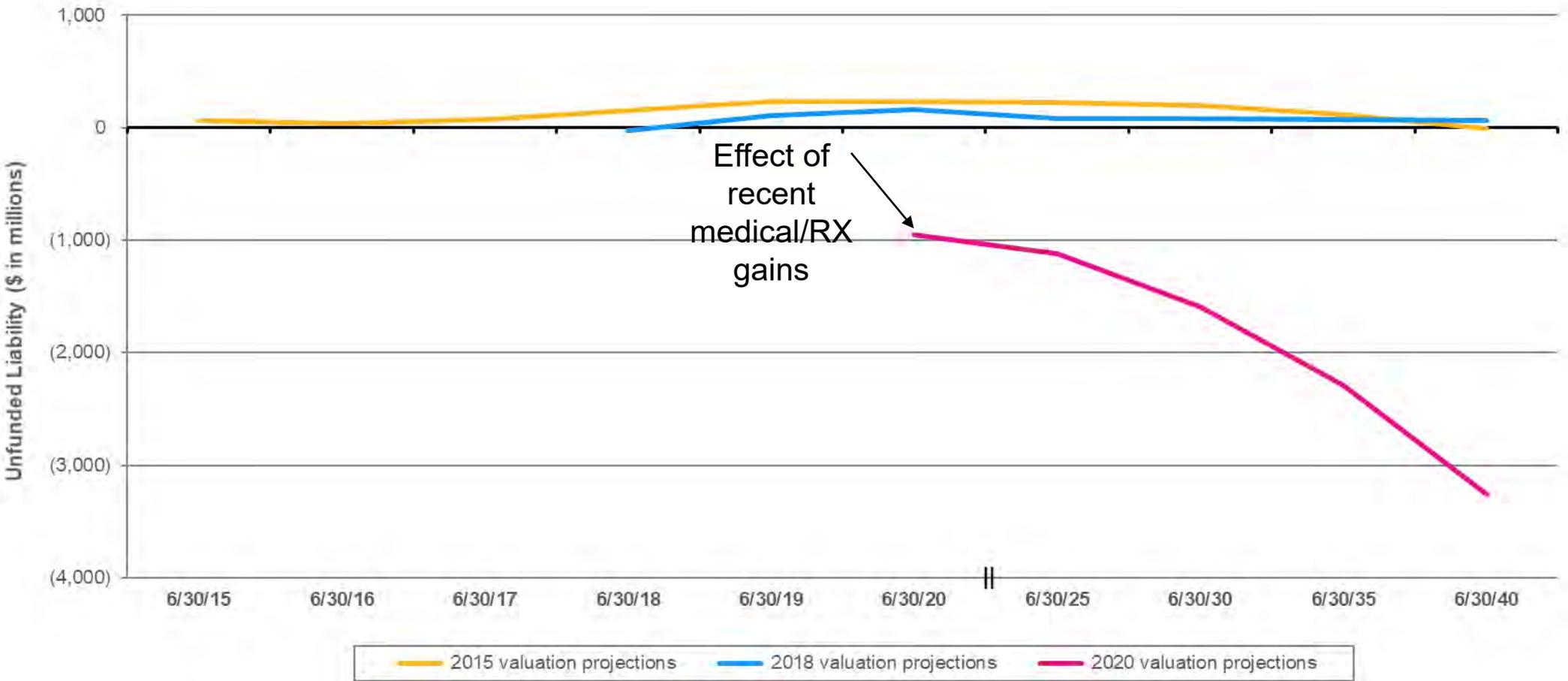
Actuarial Value of Assets – PERS Total



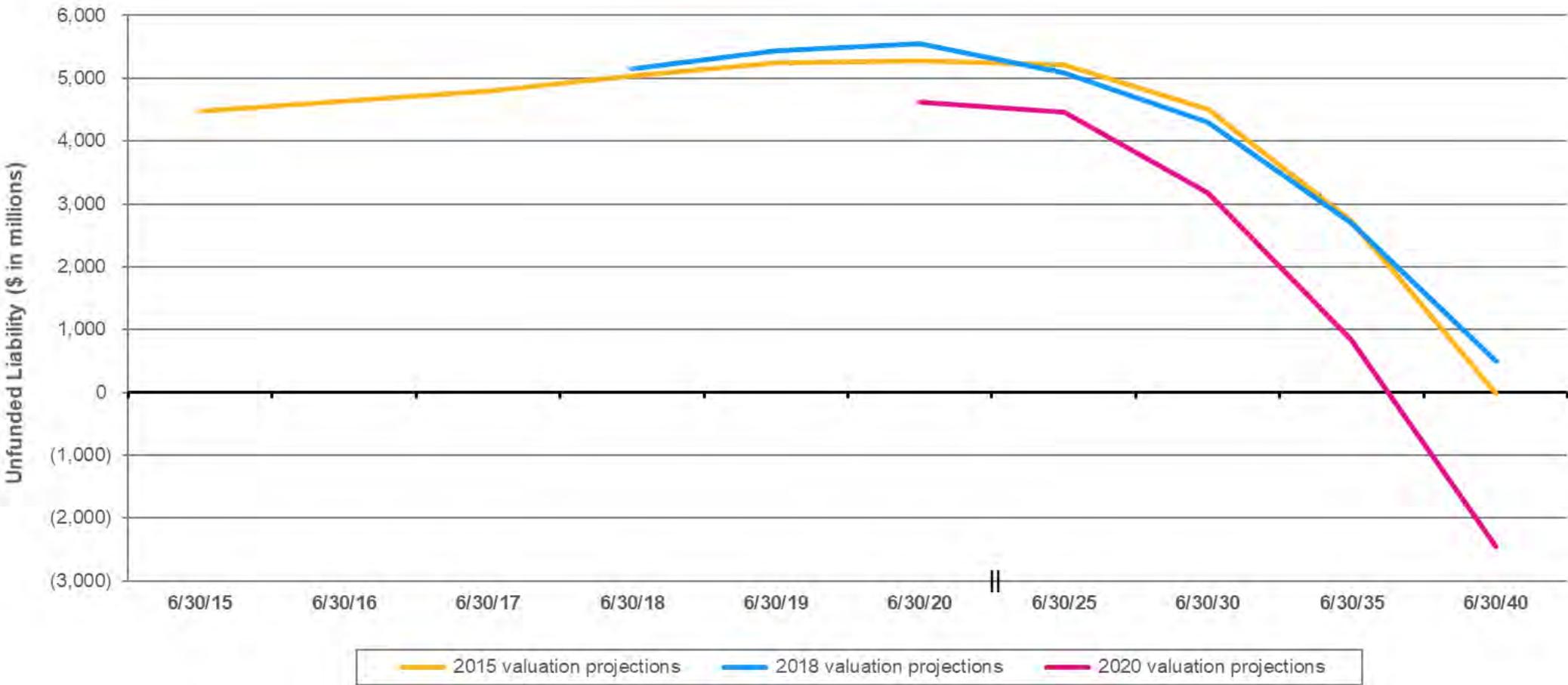
Unfunded Actuarial Accrued Liability – PERS Pension



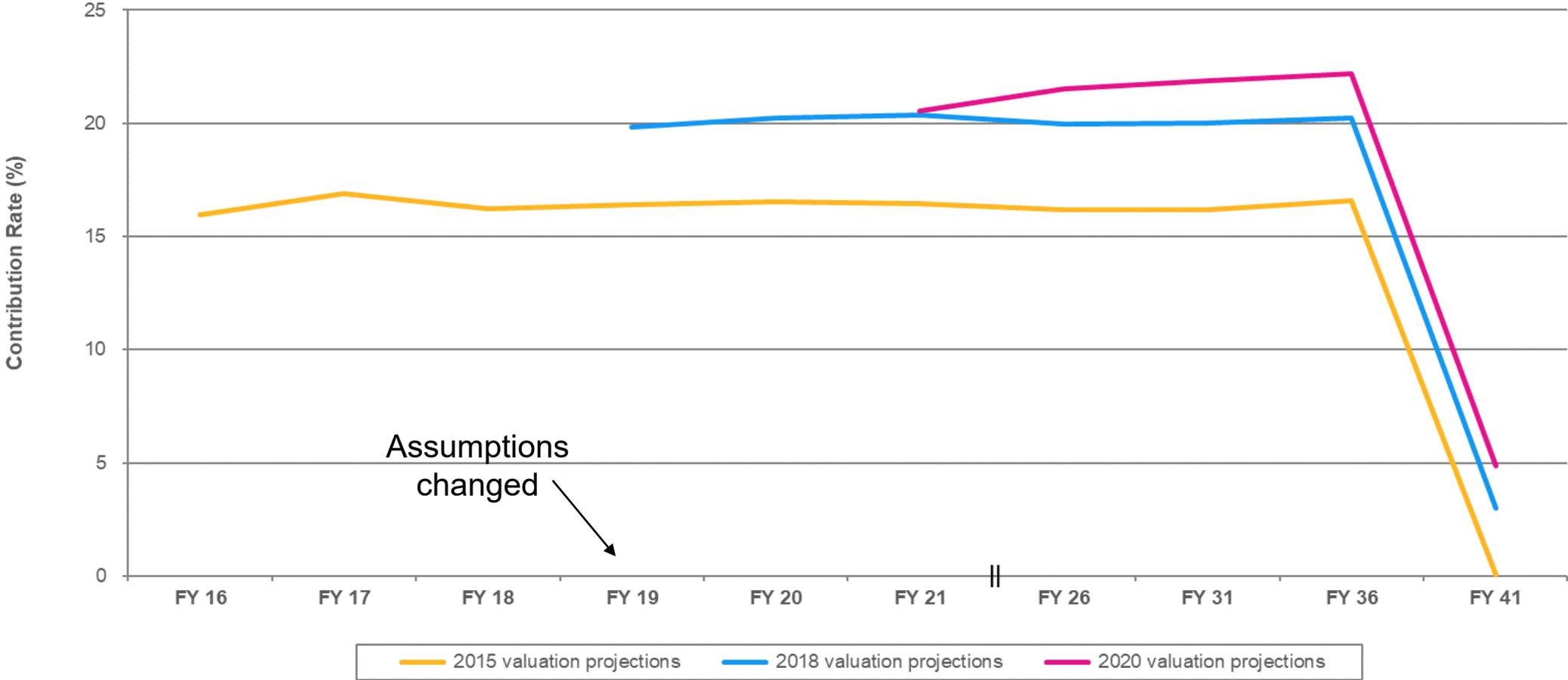
Unfunded Actuarial Accrued Liability – PERS Healthcare



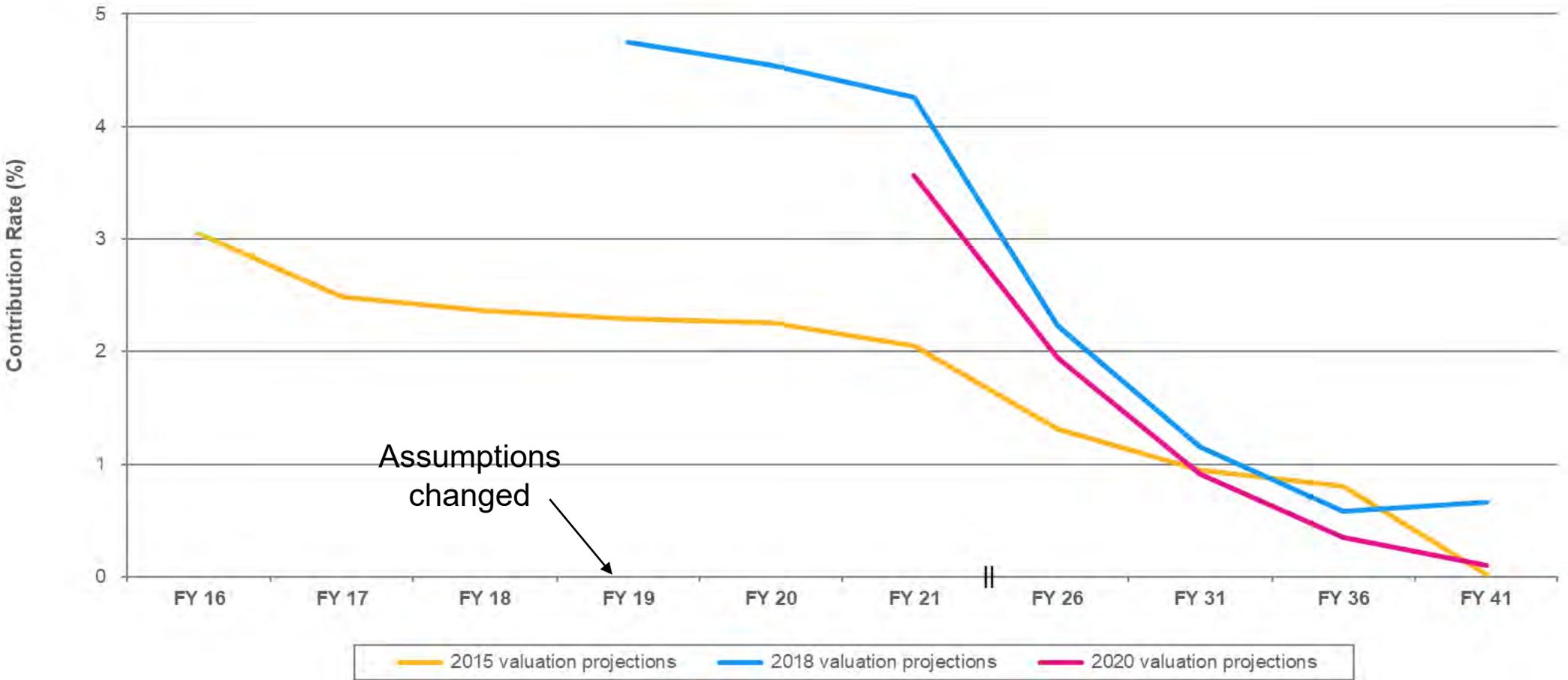
Unfunded Actuarial Accrued Liability – PERS Total



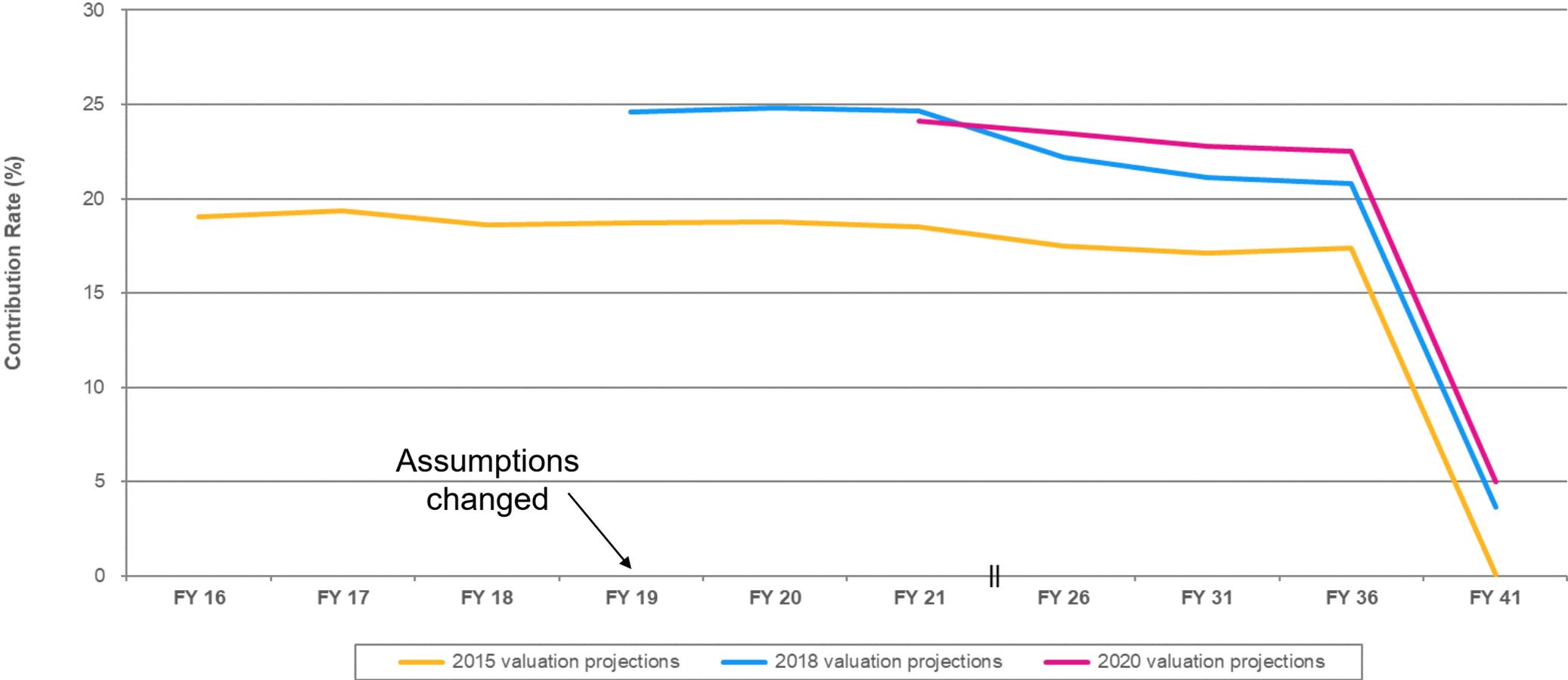
Contribution Rates – PERS Pension



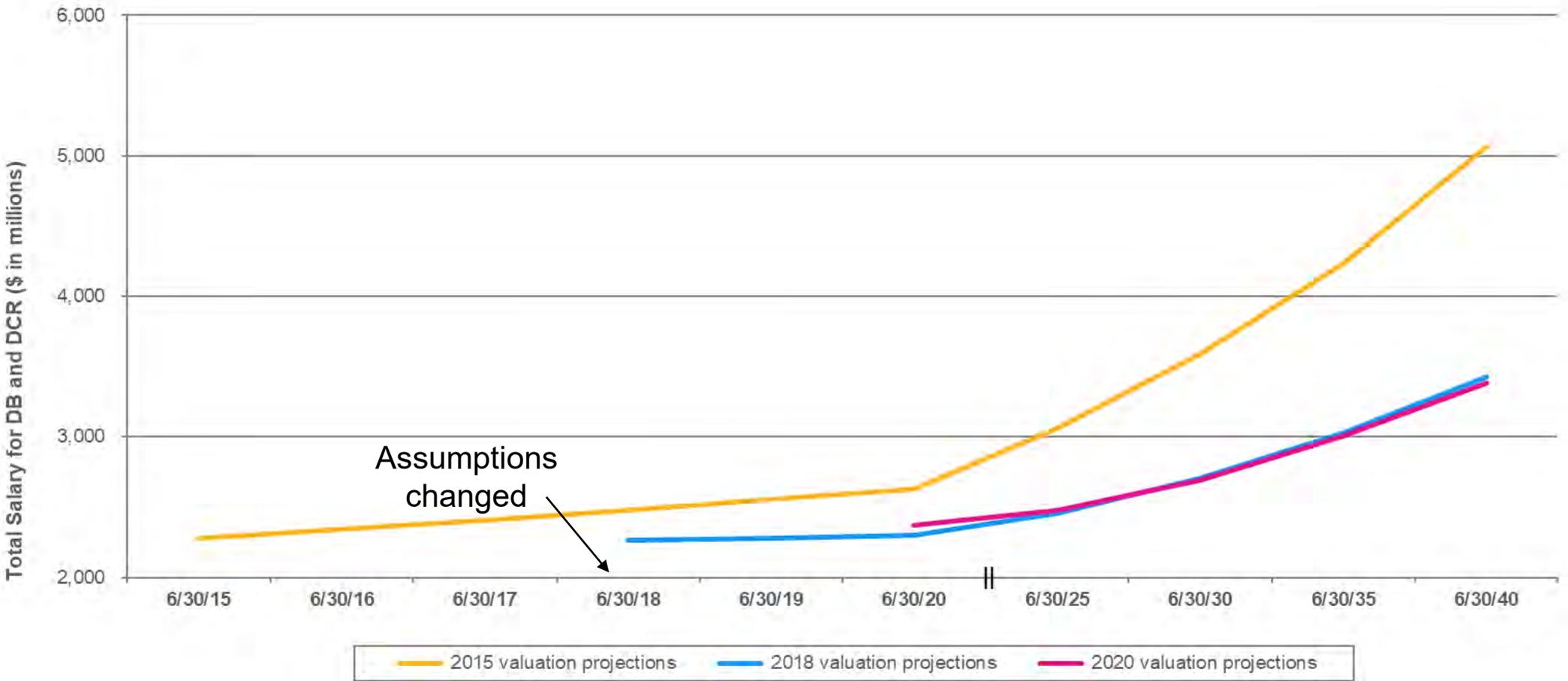
Contribution Rates – PERS Healthcare



Contribution Rates – PERS Total



DB/DCR Payroll – PERS



Impact of (Gains)/Losses – PERS Pension

6/30/2015 6/30/2016 6/30/2017 6/30/2018 6/30/2019 6/30/2020

Impact of Annual (Gains)/Losses on 6/30 Contribution Rate (% of DB and DCR pay)						
• Asset Returns	0.23%	0.73%	0.64%	0.52%	0.50%	0.44%
• Salary Increases	(0.39%)	(0.20%)	(0.36%)	(0.30%)	0.16%	(0.03%)
• Medical / Rx Claims	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
• Demographic Experience	0.27%	(0.33%)	(0.19%)	0.26%	(0.45%)	(0.19%)
• Assumption/Method Changes	0.00%	1.00%	0.00%	1.65%	0.00%	0.00%
• Actual vs Expected Contributions	<u>(2.36%)</u>	<u>0.16%</u>	<u>0.15%</u>	<u>0.14%</u>	<u>0.11%</u>	<u>0.15%</u>
• Total	<u>(2.25%)</u>	<u>1.36%</u>	<u>0.24%</u>	<u>2.27%</u>	<u>0.32%</u>	<u>0.37%</u>

Impact on 6/30 Contribution Amount Based on Projected Pay (\$000's)							<u>6-Yr Total</u>
• Asset Returns	\$ 5,238	\$ 16,652	\$ 14,769	\$ 11,913	\$ 11,337	\$ 10,328	\$ 70,237
• Salary Increases	(8,882)	(4,562)	(8,308)	(6,873)	3,628	(704)	(25,701)
• Medical / Rx Claims	0	0	0	0	0	0	0
• Demographic Experience	6,149	(7,527)	(4,385)	5,957	(10,203)	(4,460)	(14,469)
• Assumption/Method Changes	0	22,811	0	37,802	0	0	60,613
• Actual vs Expected Contributions	<u>(53,746)</u>	<u>3,650</u>	<u>3,462</u>	<u>3,207</u>	<u>2,494</u>	<u>3,521</u>	<u>(37,412)</u>
• Total	<u>\$ (51,241)</u>	<u>\$ 31,024</u>	<u>\$ 5,538</u>	<u>\$ 52,006</u>	<u>\$ 7,256</u>	<u>\$ 8,685</u>	<u>\$ 53,268</u>

Impact of (Gains)/Losses – PERS Healthcare

	<u>6/30/2015</u>	<u>6/30/2016</u>	<u>6/30/2017</u>	<u>6/30/2018</u>	<u>6/30/2019</u>	<u>6/30/2020</u>
<u>Impact of Annual (Gains)/Losses on 6/30 Contribution Rate (% of DB and DCR pay)</u>						
• Asset Returns	0.20%	0.60%	0.51%	0.40%	0.38%	0.31%
• Salary Increases	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
• Medical / Rx Claims	(3.37%)	0.59%	(2.46%)	(1.51%)	(2.39%)	(0.87%)
• Demographic Experience	0.00%	0.00%	(0.48%)	(1.08%)	1.16%	0.38%
• Assumption/Method Changes	0.00%	0.50%	2.89%	2.20%	0.00%	0.00%
• Actual vs Expected Contributions	<u>(0.19%)</u>	<u>(0.41%)</u>	<u>(0.12%)</u>	<u>0.06%</u>	<u>0.02%</u>	<u>(0.16%)</u>
• Total	<u>(3.36%)</u>	1.28%	0.34%	0.07%	(0.83%)	(0.34%)

							<u>6-Yr Total</u>
<u>Impact on 6/30 Contribution Amount Based on Projected Pay (\$000's)</u>							
• Asset Returns	\$ 4,555	\$ 13,686	\$ 11,769	\$ 9,164	\$ 8,616	\$ 7,277	\$ 55,067
• Salary Increases	0	0	0	0	0	0	0
• Medical / Rx Claims	(76,748)	13,458	(56,769)	(34,595)	(54,189)	(20,422)	(229,265)
• Demographic Experience	0	0	(11,077)	(24,743)	26,301	8,920	(599)
• Assumption/Method Changes	0	11,405	66,692	50,403	0	0	128,500
• Actual vs Expected Contributions	<u>(4,327)</u>	<u>(9,352)</u>	<u>(2,769)</u>	<u>1,375</u>	<u>453</u>	<u>(3,756)</u>	<u>(18,376)</u>
• Total	\$ (76,520)	\$ 29,197	\$ 7,846	\$ 1,604	\$ (18,819)	\$ (7,981)	\$ (64,673)

Impact of (Gains)/Losses – PERS Total

6/30/2015 6/30/2016 6/30/2017 6/30/2018 6/30/2019 6/30/2020

Impact of Annual (Gains)/Losses on 6/30 Contribution Rate (% of DB and DCR pay)						
• Asset Returns	0.43%	1.33%	1.15%	0.92%	0.88%	0.75%
• Salary Increases	(0.39%)	(0.20%)	(0.36%)	(0.30%)	0.16%	(0.03%)
• Medical / Rx Claims	(3.37%)	0.59%	(2.46%)	(1.51%)	(2.39%)	(0.87%)
• Demographic Experience	0.27%	(0.33%)	(0.67%)	(0.82%)	0.71%	0.19%
• Assumption/Method Changes	0.00%	1.50%	2.89%	3.85%	0.00%	0.00%
• Actual vs Expected Contributions	<u>(2.55%)</u>	<u>(0.25%)</u>	<u>0.03%</u>	<u>0.20%</u>	<u>0.13%</u>	<u>(0.01%)</u>
• Total	(5.61%)	2.64%	0.58%	2.34%	(0.51%)	0.03%

Impact on 6/30 Contribution Amount Based on Projected Pay (\$000's)							<u>6-Yr Total</u>
• Asset Returns	\$ 9,793	\$ 30,338	\$ 26,538	\$ 21,078	\$ 19,953	\$ 17,605	\$ 125,305
• Salary Increases	(8,882)	(4,562)	(8,308)	(6,873)	3,628	(704)	(25,701)
• Medical / Rx Claims	(76,748)	13,458	(56,769)	(34,595)	(54,189)	(20,422)	(229,265)
• Demographic Experience	6,149	(7,527)	(15,461)	(18,787)	16,098	4,460	(15,068)
• Assumption/Method Changes	0	34,216	66,692	88,205	0	0	189,113
• Actual vs Expected Contributions	<u>(58,073)</u>	<u>(5,703)</u>	<u>692</u>	<u>4,582</u>	<u>2,948</u>	<u>(235)</u>	<u>(55,789)</u>
• Total	\$ (127,761)	\$ 60,220	\$ 13,384	\$ 53,610	\$ (11,562)	\$ 704	\$ (11,405)

Appendix

Explanation of Terms

- “6/30/19”
 - The results from the 6/30/19 valuation
- “6/30/20 Expected”
 - Results as of 6/30/20 if FY20 experience matched all of the assumptions that were used in the 6/30/19 valuation (e.g., assets earned 7.38%, salaries increased as expected, members retired according to what the retirement assumption predicted, etc.)
- “6/30/20 Actual”
 - Results as of 6/30/20 reflecting actual FY20 asset performance, and actual changes in the participant data from 6/30/19 to 6/30/20
- Gains and losses are the differences between “6/30/20 Expected” and “6/30/20 Actual”
 - If the difference is *favorable* to the plan, we have an actuarial *gain*
 - If the difference is *unfavorable* to the plan, we have an actuarial *loss*

Valuation Results - PERS

PERS – Valuation Results (Pension)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	15,039,180	15,370,337	15,279,525
Actuarial Value of Assets	9,576,693	9,873,715	9,713,710
Market Value of Assets	9,489,405	9,779,985	9,469,161
Unfunded Actuarial Accrued Liability*	5,462,487	5,496,622	5,565,815
Funded Ratio*	63.7%	64.2%	63.6%
Normal Cost (without loads)	119,185	108,221	109,953
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	3.34%	not available	3.09%
- Unfunded Liability Amortization	16.83%	not available	17.45%
- Total (not less than Normal Cost)	20.17%	not available	20.54%

* Based on Actuarial Value of Assets

** % of DB/DCR payroll

PERS – Valuation Results (Healthcare)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	7,151,694	7,386,509	7,036,550
Actuarial Value of Assets	7,810,491	8,104,221	7,989,358
Market Value of Assets	7,767,692	8,058,264	7,813,511
Unfunded Actuarial Accrued Liability*	(658,797)	(717,712)	(952,808)
Funded Ratio*	109.2%	109.7%	113.5%
Normal Cost (without loads)	75,131	68,312	68,230
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	3.91%	not available	3.57%
- Unfunded Liability Amortization	(1.84)%	not available	(2.66)%
- Total (not less than Normal Cost)	3.91%	not available	3.57%

* Based on Actuarial Value of Assets

** % of DB/DCR payroll

PERS – Valuation Results (Total)

(\$000's)

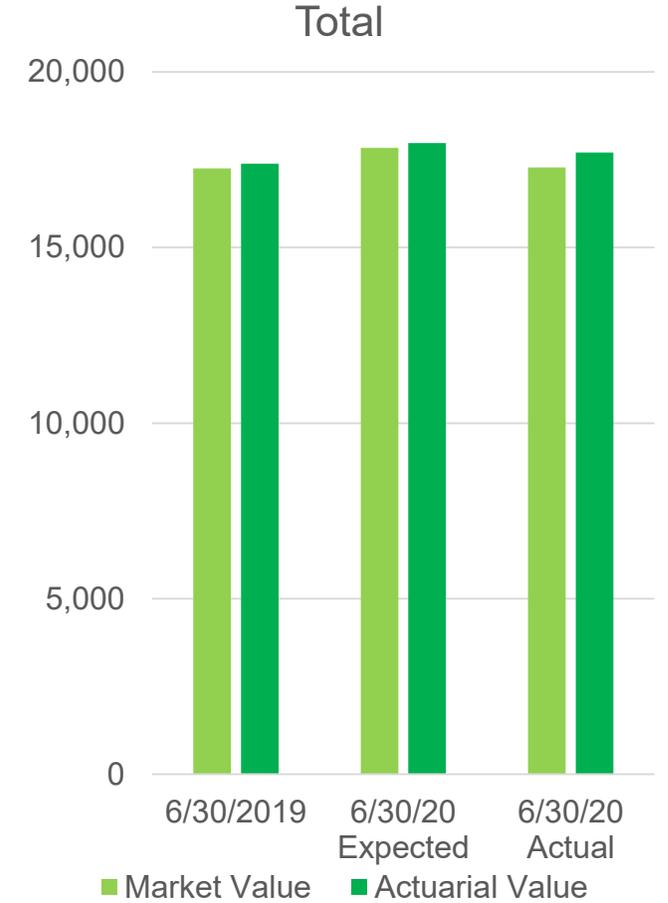
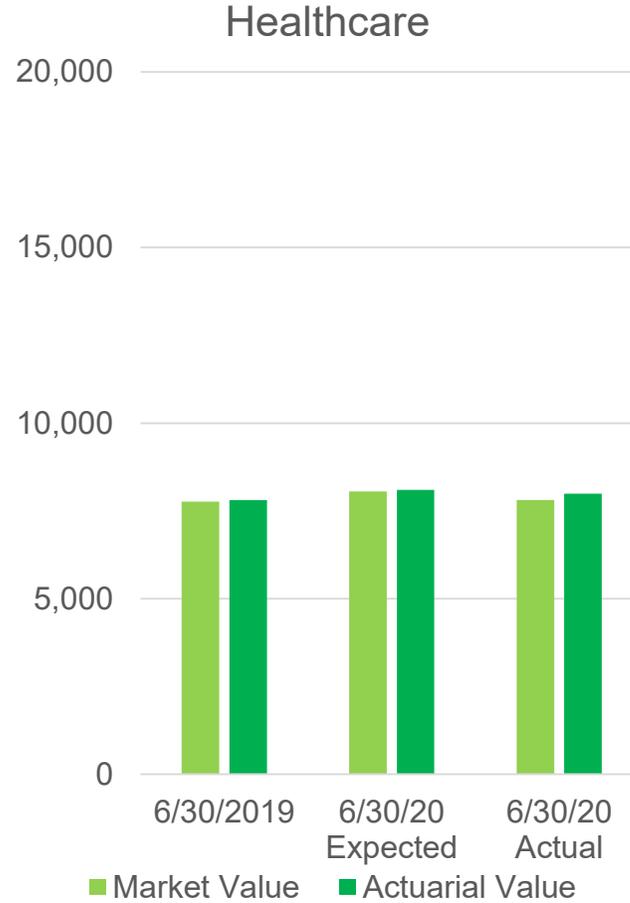
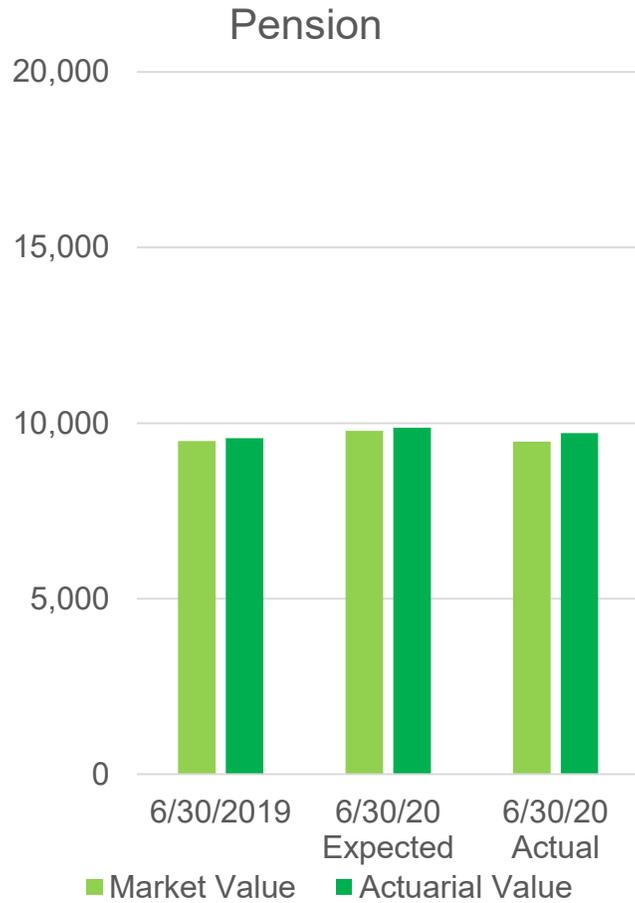
	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	22,190,874	22,756,846	22,316,075
Actuarial Value of Assets	17,387,184	17,977,936	17,703,068
Market Value of Assets	17,257,097	17,838,249	17,282,672
Unfunded Actuarial Accrued Liability*	4,803,690	4,778,910	4,613,007
Funded Ratio*	78.4%	79.0%	79.3%
Normal Cost (without loads)	194,316	176,533	178,183
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	7.25%	not available	6.66%
- Unfunded Liability Amortization	16.83%	not available	17.45%
- Total (not less than Normal Cost)	24.08%	not available	24.11%

* Based on Actuarial Value of Assets

** % of DB/DCR payroll

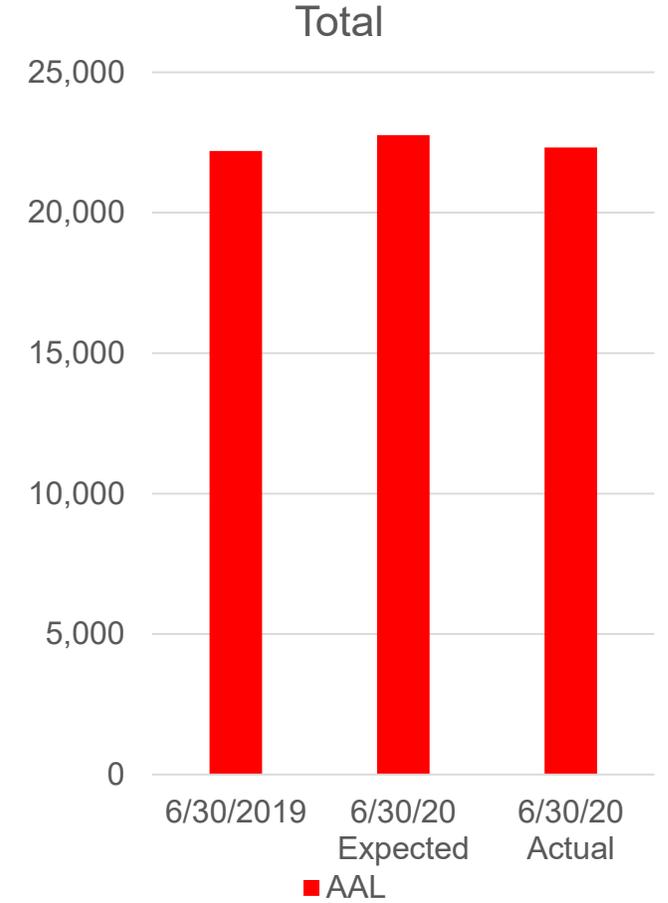
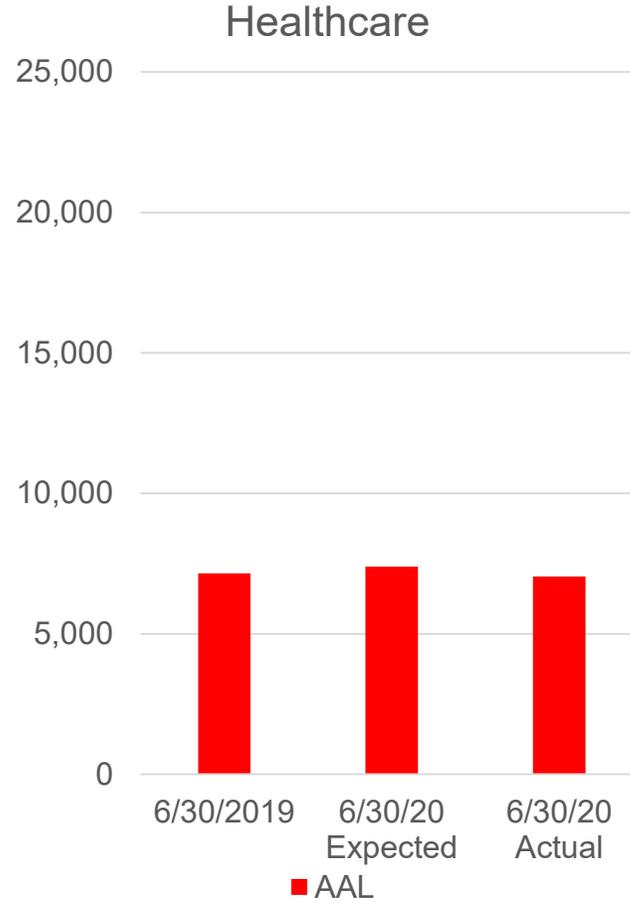
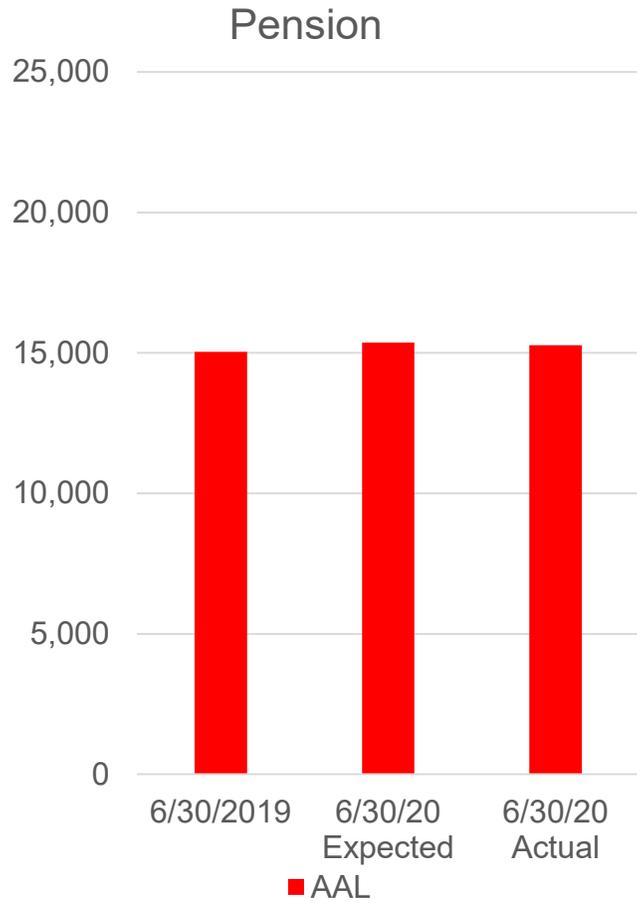
PERS – Assets

(\$millions)



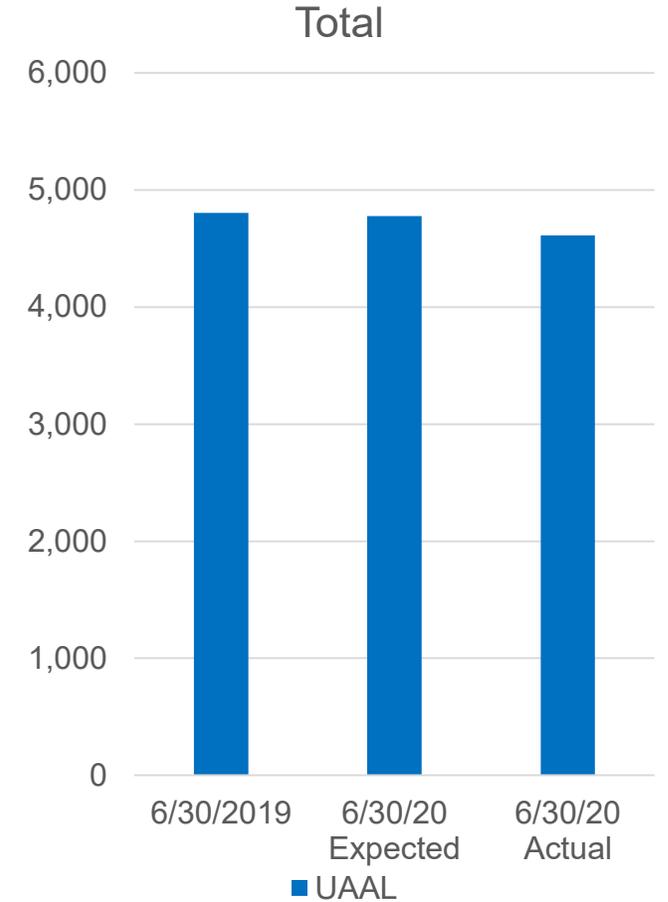
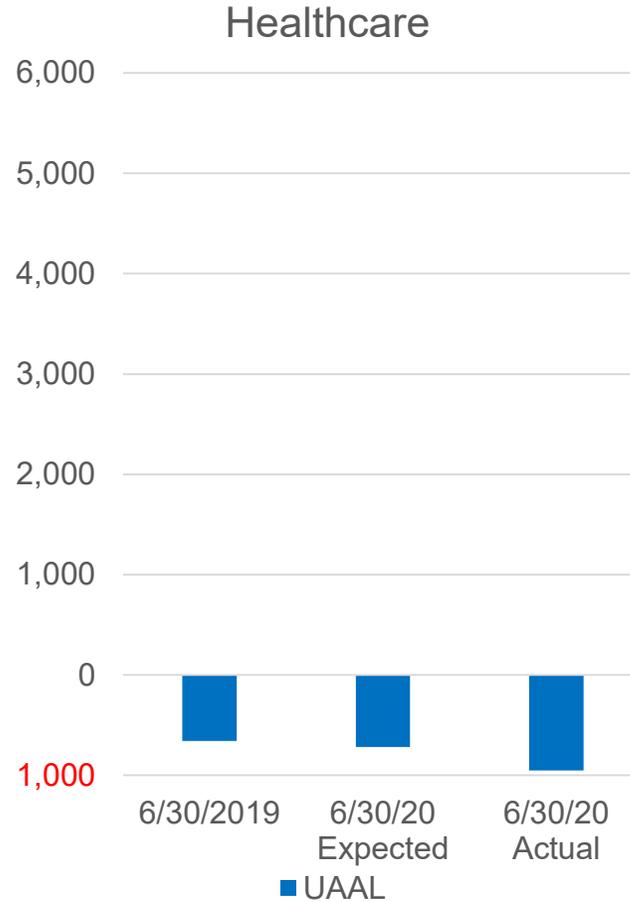
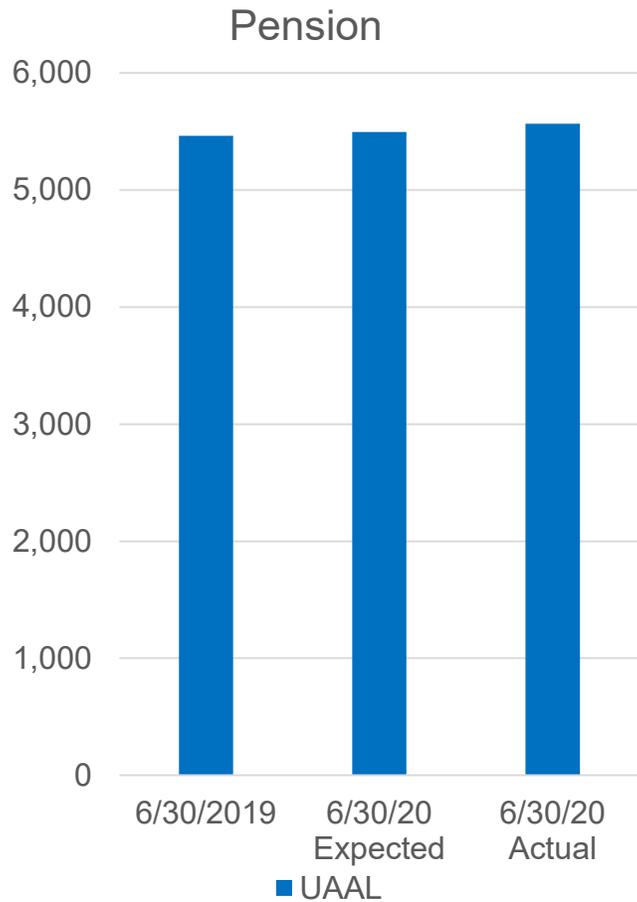
PERS – Actuarial Accrued Liability

(\$millions)

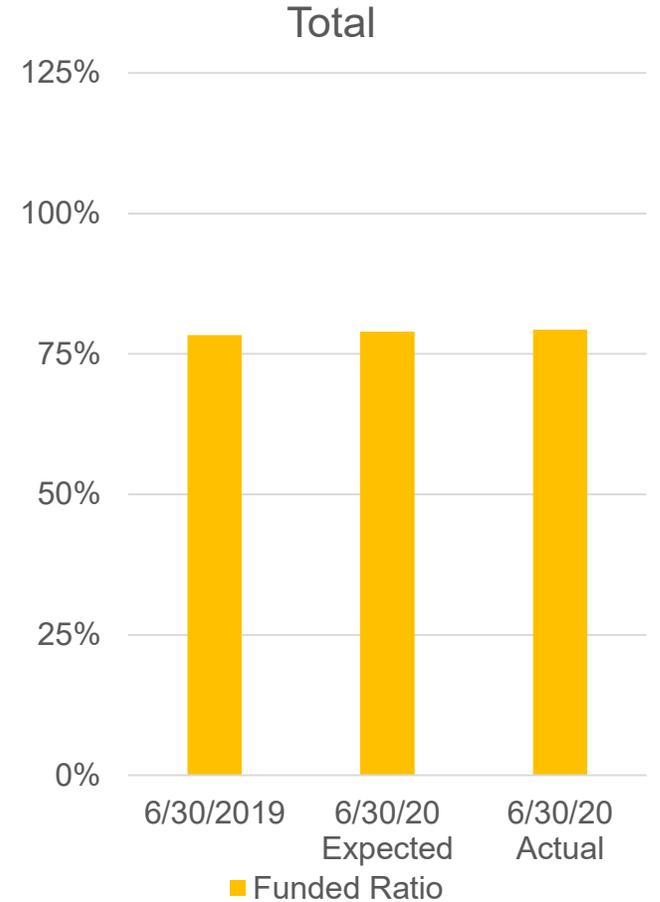
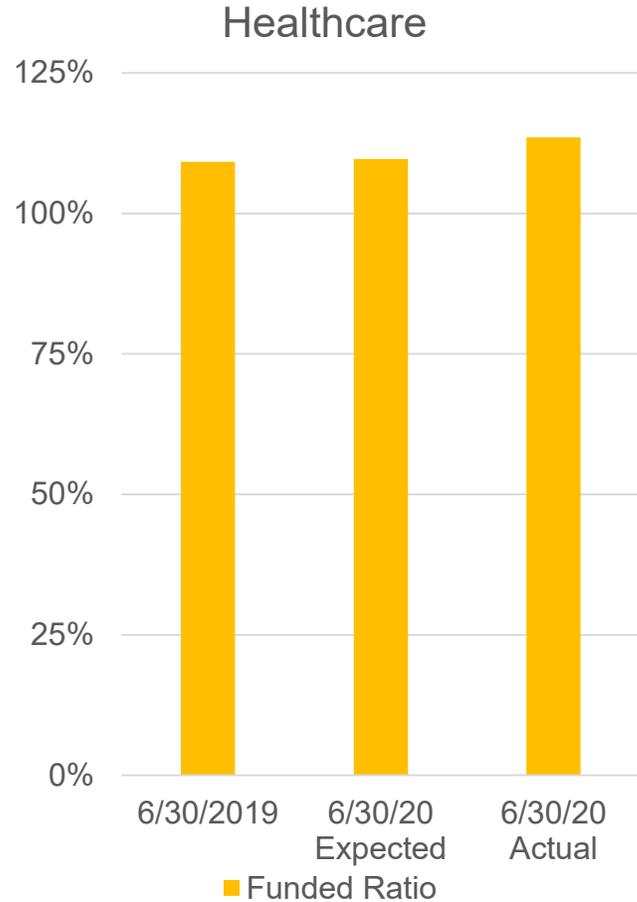
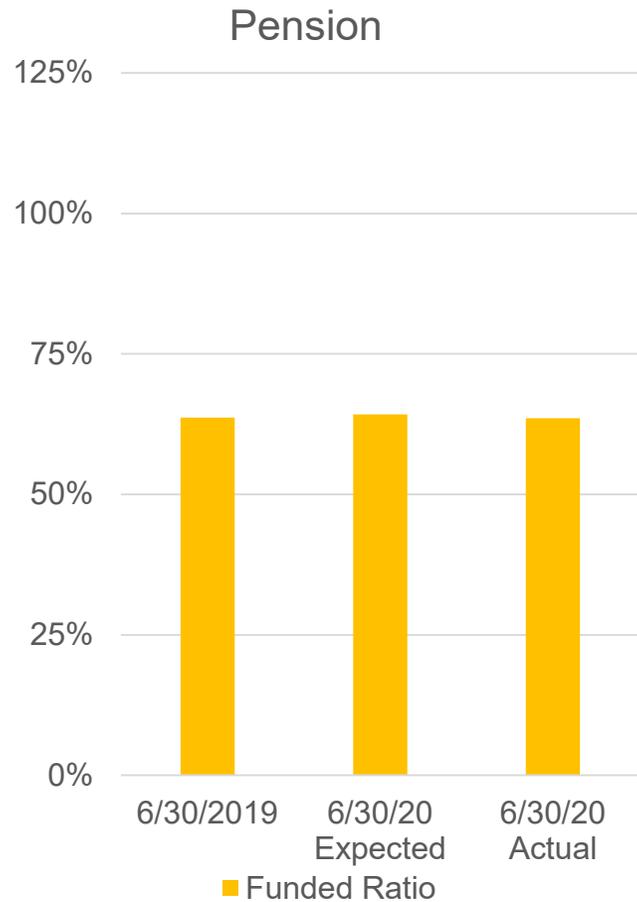


PERS – Unfunded Actuarial Accrued Liability

(\$millions)



PERS – Funded Ratio (AVA vs. AAL)



PERS – FY20 Actuarial Gains/(Losses)

(\$millions)

	Pension	Healthcare	Total
Actuarial Accrued Liabilities			
- Demographic Experience (non-mortality)	(7.0)	(2.3)	(9.3)
- Mortality Experience	(6.4)	0.2	(6.2)
- Salary Increases	11.2	n/a	11.2
- Rehires (net of rehire load)	8.4	16.0	24.4
- COLA/PRPA Increases	78.8	n/a	78.8
- Per Capita Claims Cost	n/a	278.8	278.8
- COVID-19 Experience	n/a	25.9	25.9
- Medicare Part B Only Experience	n/a	6.3	6.3
- Changes in Dependent Coverage Elections	n/a	23.4	23.4
- Miscellaneous*	<u>5.8</u>	<u>1.7</u>	<u>7.5</u>
- Total	90.8	350.0	440.8
Actuarial Value of Assets	(160.0)	(114.9)	(274.9)
Actual vs Expected Contributions	(55.4)	59.1	3.7
Actual vs Expected Admin Expenses	<u>0.1</u>	<u>(2.4)</u>	<u>(2.3)</u>
TOTAL	(124.5)	291.8	167.3

* Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories shown on this slide.

Valuation Results - TRS

TRS – Valuation Results (Pension)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	7,388,020	7,477,916	7,447,036
Actuarial Value of Assets	5,563,931	5,682,454	5,587,064
Market Value of Assets	5,511,929	5,626,615	5,444,799
Unfunded Actuarial Accrued Liability*	1,824,089	1,795,462	1,859,972
Funded Ratio*	75.3%	76.0%	75.0%
Normal Cost (without loads)	43,830	40,221	41,880
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	3.04%	not available	2.86%
- Unfunded Liability Amortization	18.37%	not available	18.87%
- Total (not less than Normal Cost)	21.41%	not available	21.73%

* Based on Actuarial Value of Assets

** % of DB/DCR payroll

TRS – Valuation Results (Healthcare)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	2,518,644	2,613,061	2,489,675
Actuarial Value of Assets	2,947,562	3,065,417	3,021,283
Market Value of Assets	2,929,319	3,045,828	2,953,461
Unfunded Actuarial Accrued Liability*	(428,918)	(452,356)	(531,608)
Funded Ratio*	117.0%	117.3%	121.4%
Normal Cost (without loads)	21,832	20,274	20,581
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	3.57%	not available	3.30%
- Unfunded Liability Amortization	(3.91)%	not available	(4.82)%
- Total (not less than Normal Cost)	3.57%	not available	3.30%

* Based on Actuarial Value of Assets

** % of DB/DCR payroll

TRS – Valuation Results (Total)

(\$000's)

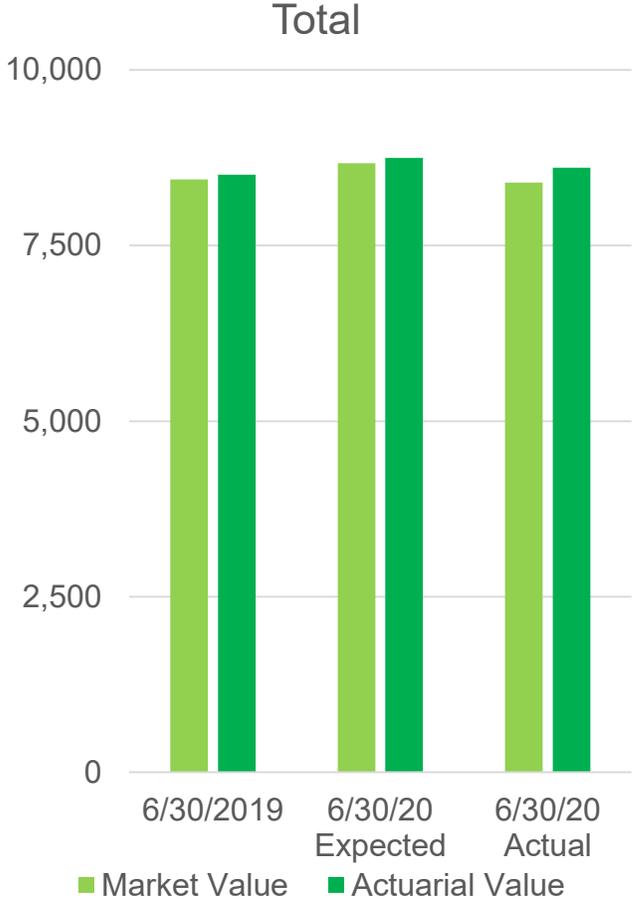
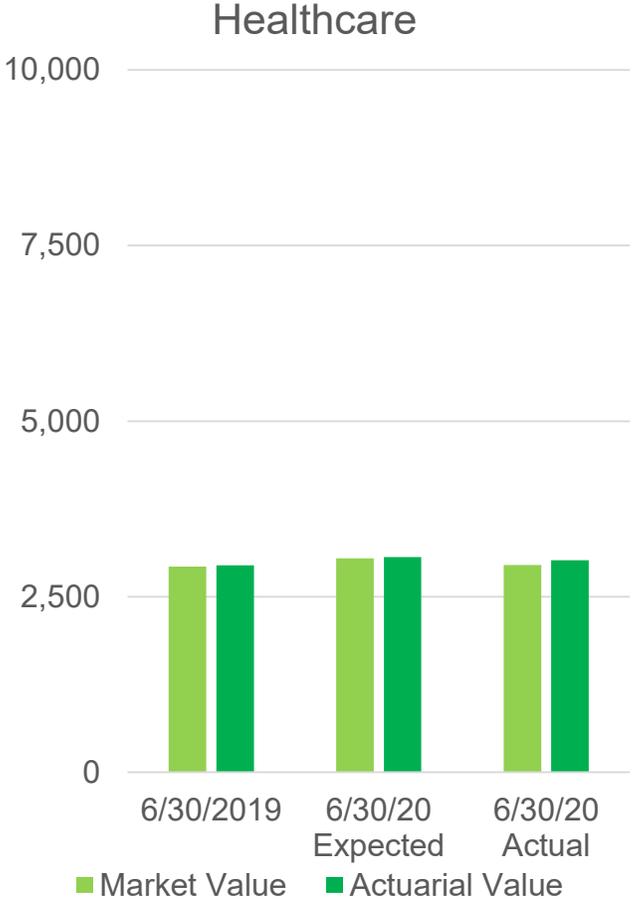
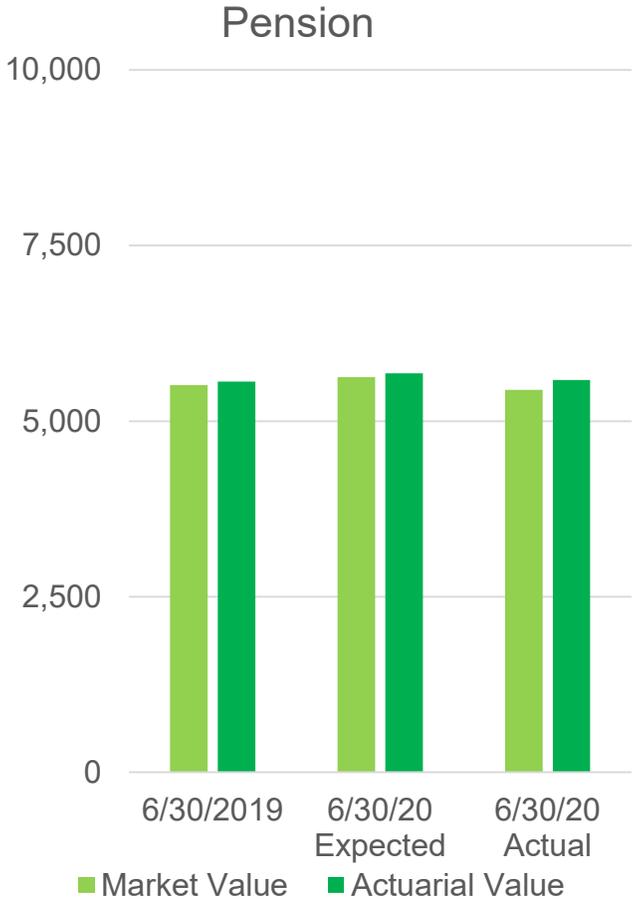
	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	9,906,664	10,090,977	9,936,711
Actuarial Value of Assets	8,511,493	8,747,871	8,608,347
Market Value of Assets	8,441,248	8,672,443	8,398,260
Unfunded Actuarial Accrued Liability*	1,395,171	1,343,106	1,328,364
Funded Ratio*	85.9%	86.7%	86.6%
Normal Cost (without loads)	65,662	60,495	62,461
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	6.61%	not available	6.16%
- Unfunded Liability Amortization	18.37%	not available	18.87%
- Total (not less than Normal Cost)	24.98%	not available	25.03%

* Based on Actuarial Value of Assets

** % of DB/DCR payroll

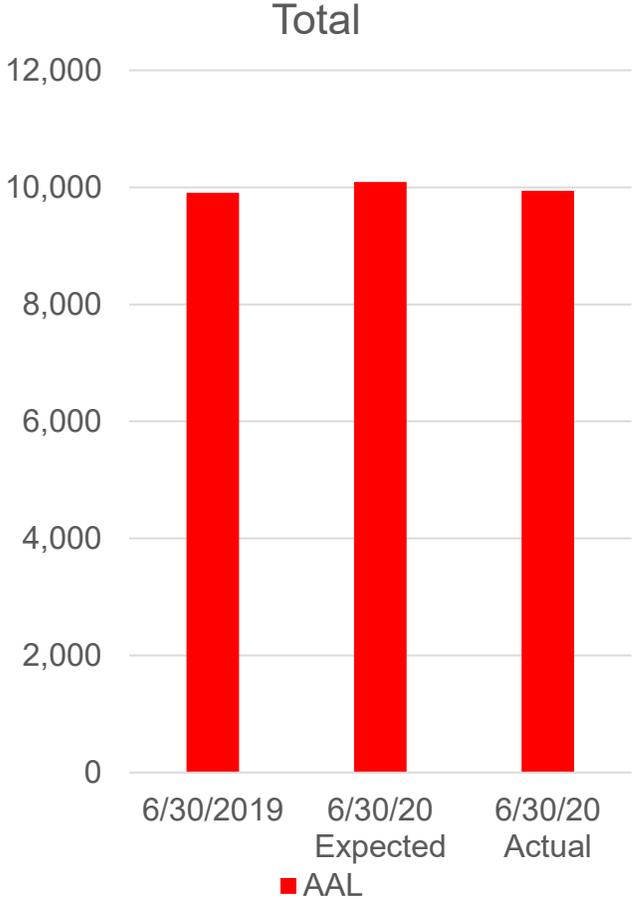
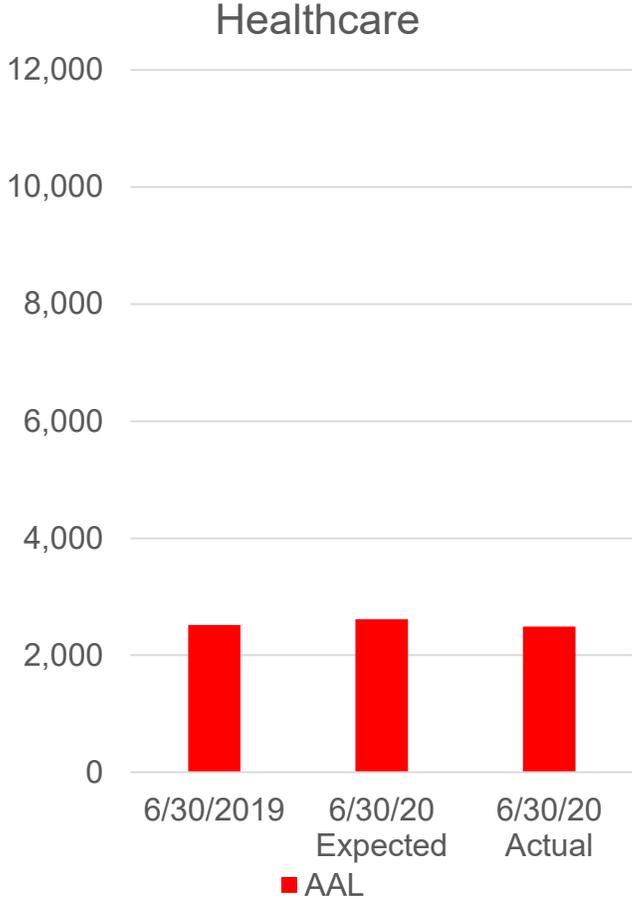
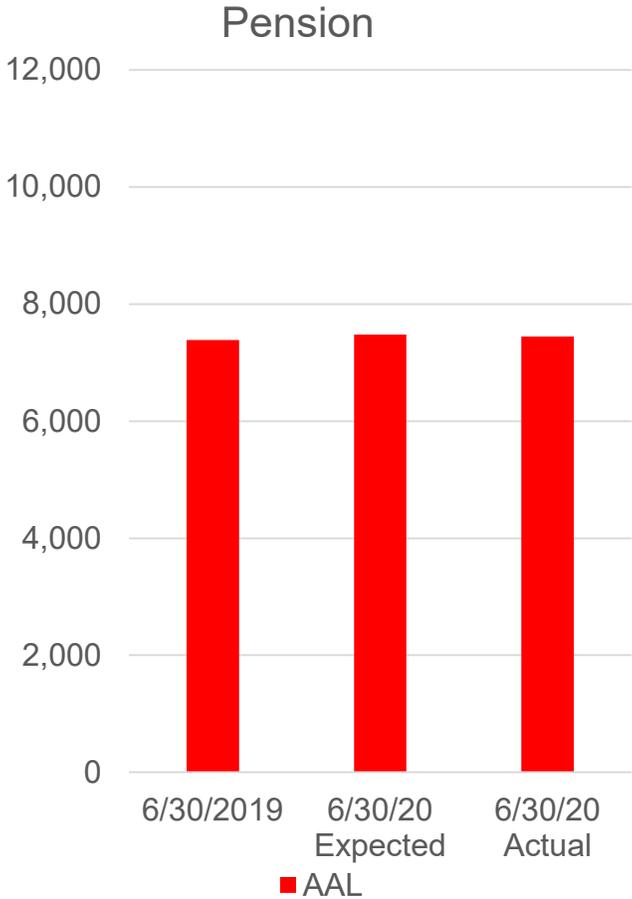
TRS – Assets

(\$millions)



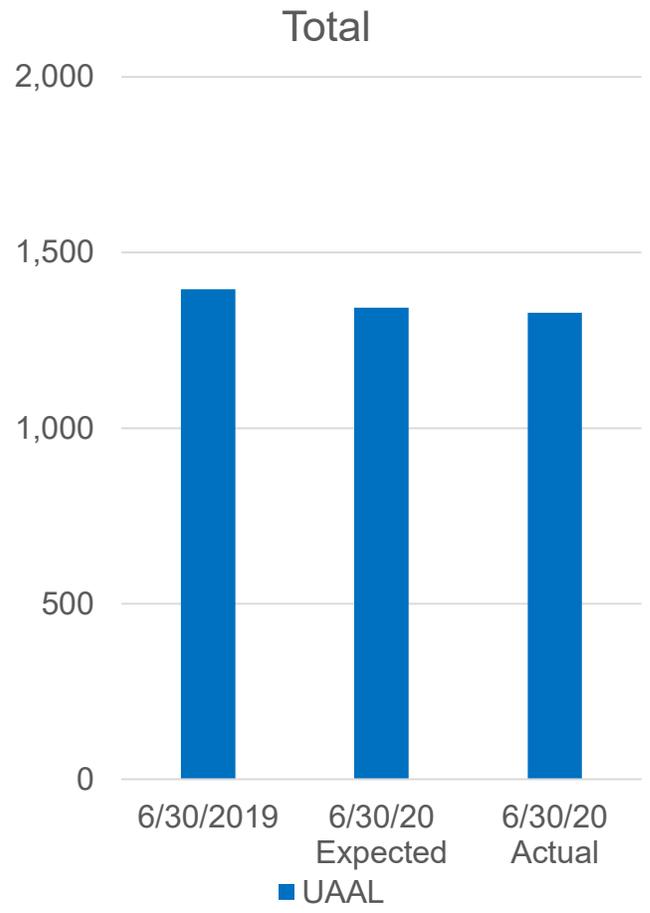
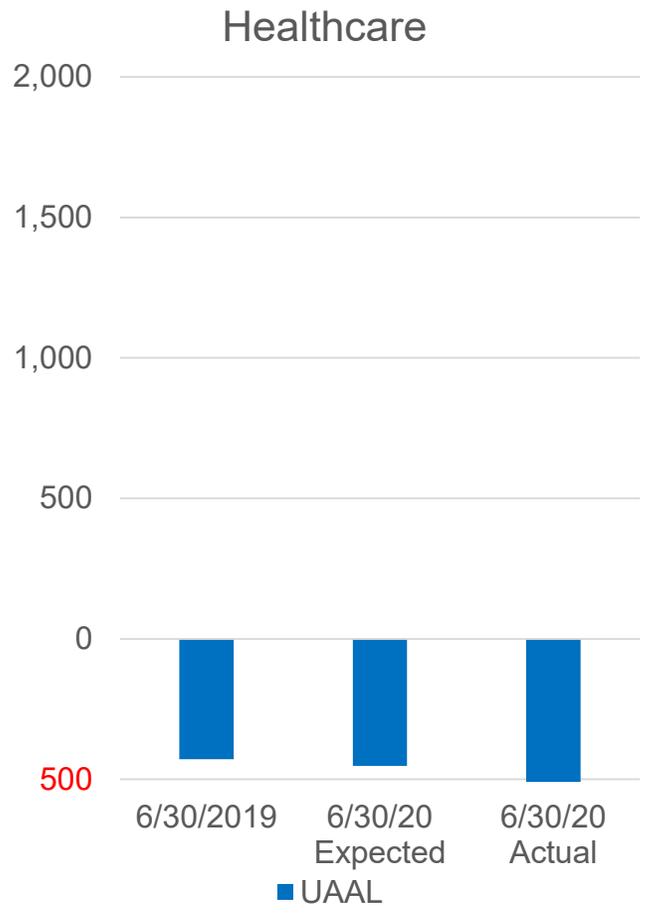
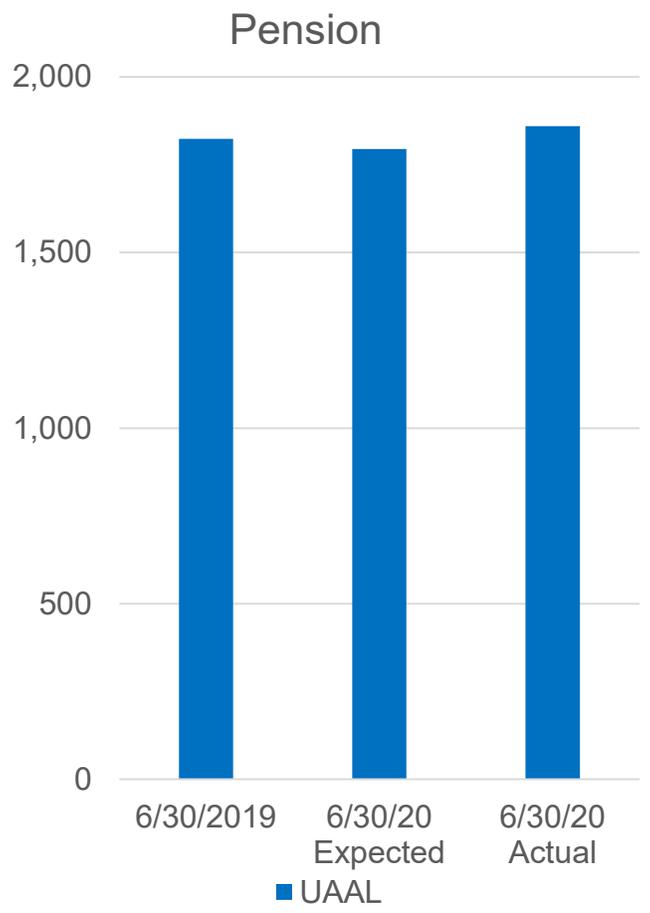
TRS – Actuarial Accrued Liability

(\$millions)

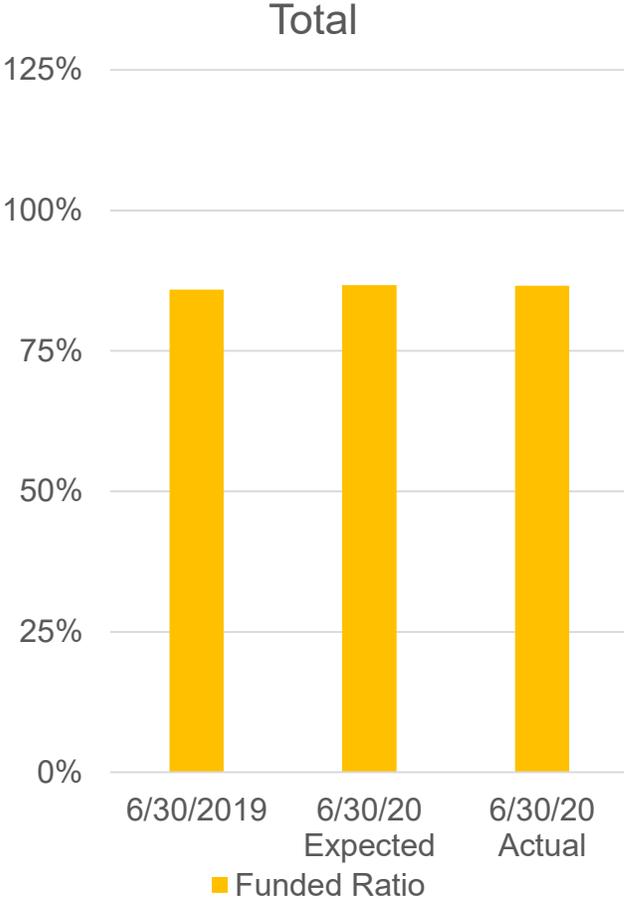
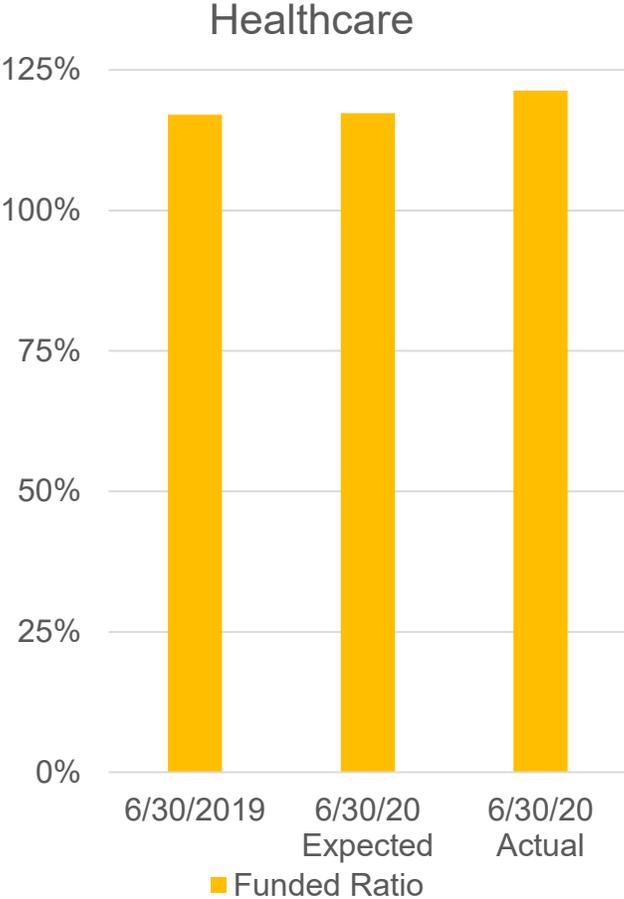
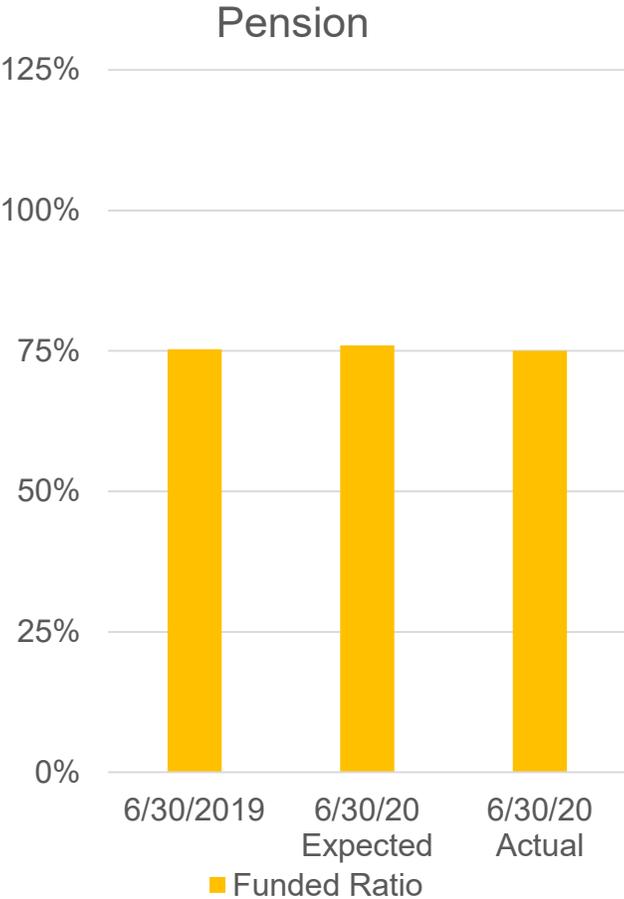


TRS – Unfunded Actuarial Accrued Liability

(\$millions)



TRS – Funded Ratio (AVA vs. AAL)



TRS – FY20 Actuarial Gains/(Losses)

(\$millions)

	Pension	Healthcare	Total
Actuarial Accrued Liabilities			
- Demographic Experience (non-mortality)	(3.8)	1.0	(2.8)
- Mortality Experience	(11.2)	(2.3)	(13.5)
- Salary Increases	6.4	n/a	6.4
- Rehires (net of rehire load)	(0.7)	5.5	4.8
- COLA/PRPA Increases	43.4	n/a	43.4
- Per Capita Claims Cost	n/a	96.8	96.8
- COVID-19 Experience	n/a	17.3	17.3
- Medicare Part B Only Experience	n/a	2.1	2.1
- Changes in Dependent Coverage Elections	n/a	7.4	7.4
- Miscellaneous*	<u>(3.2)</u>	<u>(4.4)</u>	<u>(7.6)</u>
- Total	30.9	123.4	154.3
Actuarial Value of Assets	(95.4)	(44.1)	(139.5)
Actual vs Expected Contributions	20.0	22.1	42.1
Actual vs Expected Admin Expenses	<u>0.2</u>	<u>0.1</u>	<u>0.3</u>
TOTAL	(44.3)	101.5	57.2

* Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories shown on this slide.

Valuation Results - PERS DCR

PERS DCR – Valuation Results (Occ D&D)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	9,774	15,160	10,634
Actuarial Value of Assets	36,701	43,458	43,029
Market Value of Assets	36,525	43,269	42,091
Unfunded Actuarial Accrued Liability*	(26,927)	(28,298)	(32,395)
Funded Ratio*	375.5%	286.7%	404.6%
Normal Cost (without loads)	4,808	not available	5,133
Employer Contribution Rate as of 6/30**			
- Normal Cost	0.36%	not available	0.36%
- Unfunded Liability Amortization	(0.15)%	not available	(0.17)%
- Total (not less than Normal Cost)	0.36%	not available	0.36%

* Based on Actuarial Value of Assets

** % of DCR payroll

PERS DCR – Valuation Results (Retiree Medical)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	124,946	156,378	150,701
Actuarial Value of Assets	118,783	145,979	144,747
Market Value of Assets	118,238	145,394	141,569
Unfunded Actuarial Accrued Liability*	6,163	10,399	5,954
Funded Ratio*	95.1%	93.3%	96.0%
Normal Cost (without loads)	13,747	not available	15,162
Employer Contribution Rate as of 6/30**			
- Normal Cost	1.02%	not available	1.05%
- Unfunded Liability Amortization	0.05%	not available	0.05%
- Total (not less than Normal Cost)	1.07%	not available	1.10%

* Based on Actuarial Value of Assets

** % of DCR payroll

PERS DCR – Valuation Results (Total)

(\$000's)

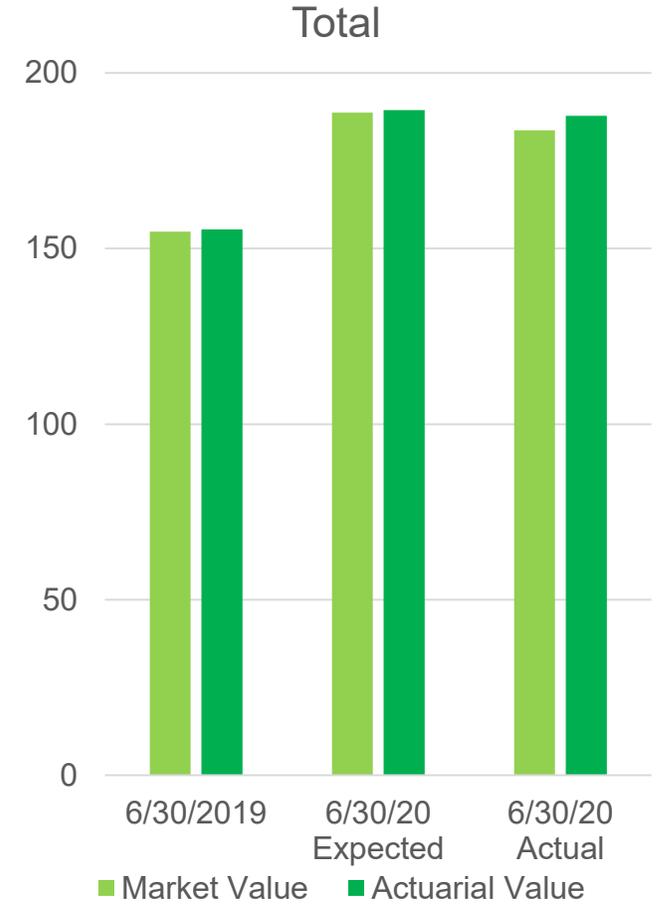
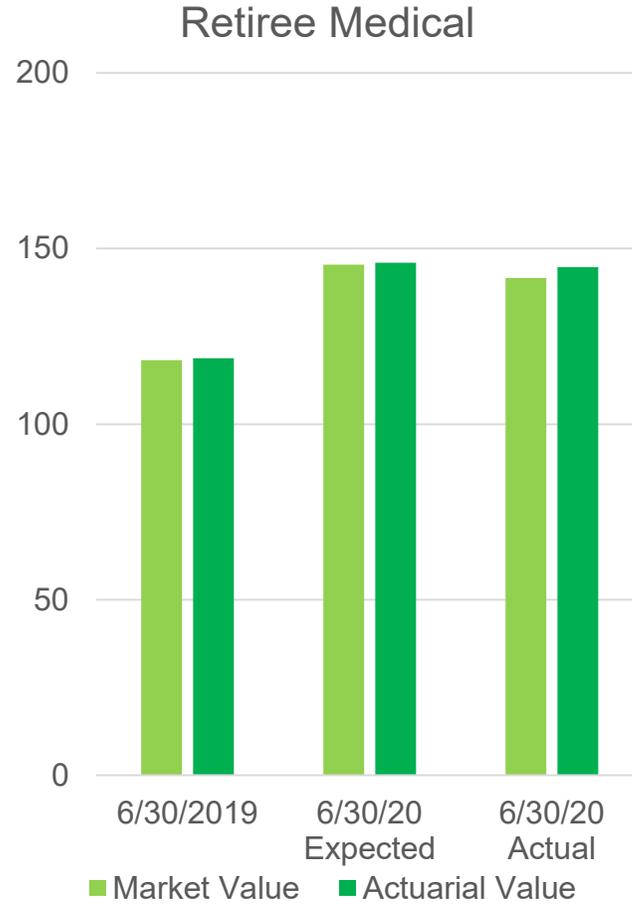
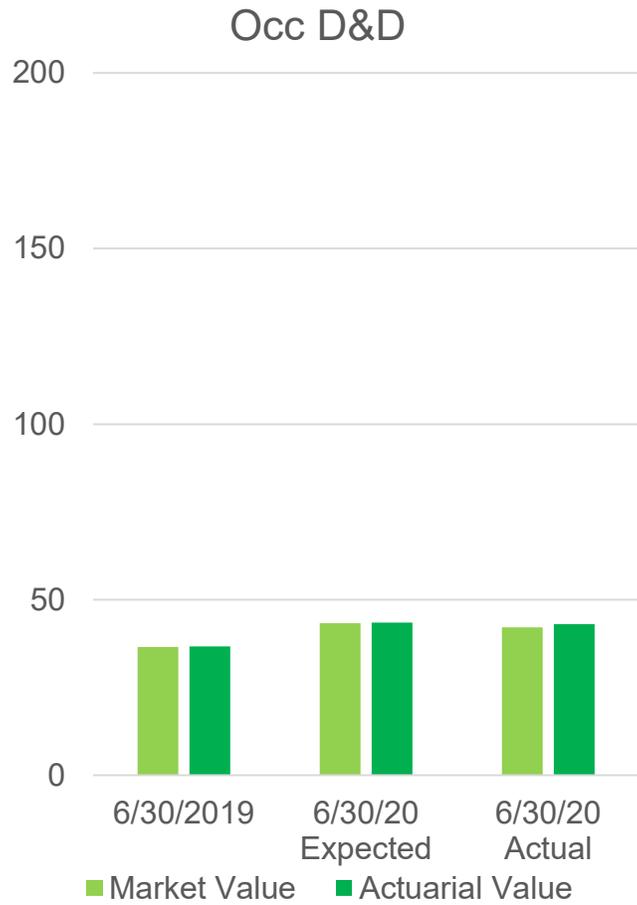
	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	134,720	171,538	161,335
Actuarial Value of Assets	155,484	189,437	187,776
Market Value of Assets	154,763	188,663	183,660
Unfunded Actuarial Accrued Liability*	(20,764)	(17,899)	(26,441)
Funded Ratio*	115.4%	110.4%	116.4%
Normal Cost (without loads)	18,555	not available	20,295
Employer Contribution Rate as of 6/30**			
- Normal Cost	1.38%	not available	1.41%
- Unfunded Liability Amortization	0.05%	not available	0.05%
- Total (not less than Normal Cost)	1.43%	not available	1.46%

* Based on Actuarial Value of Assets

** % of DCR payroll

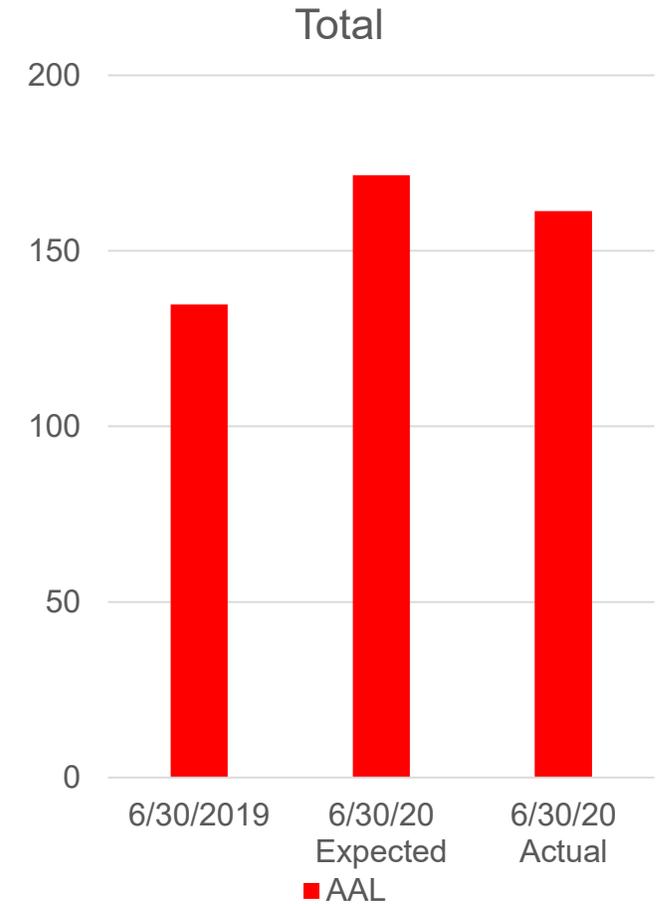
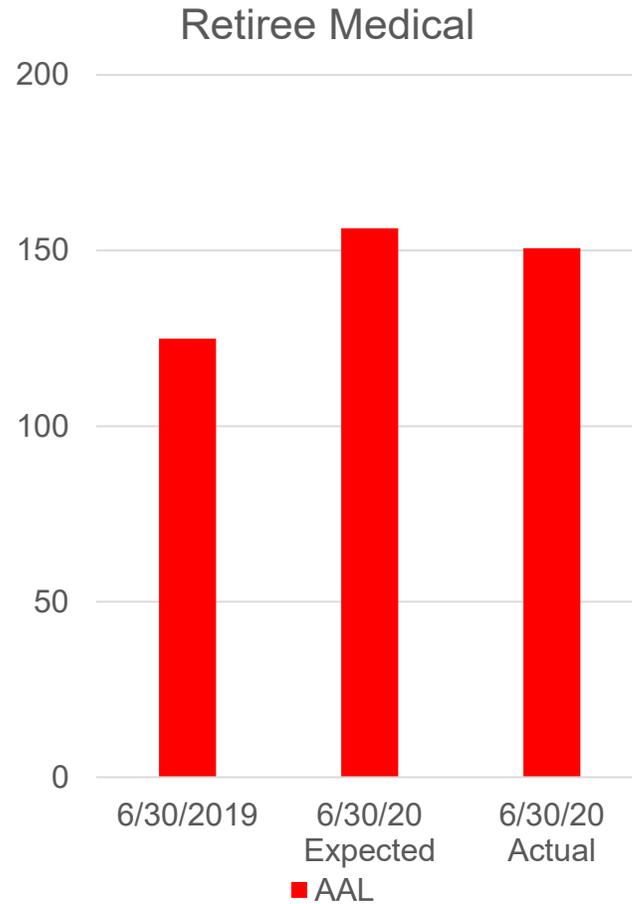
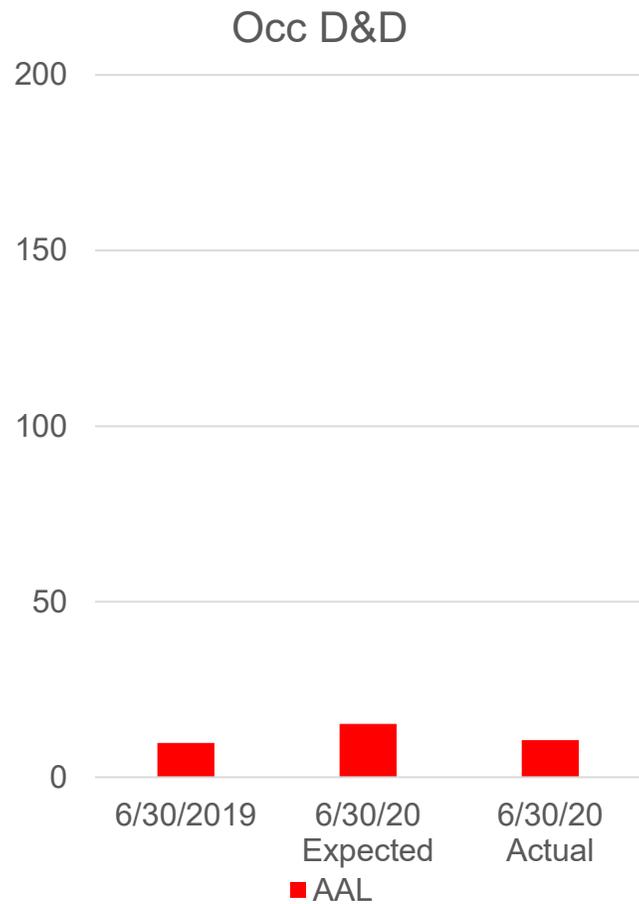
PERS DCR – Assets

(\$000's)



PERS DCR – Actuarial Accrued Liability

(\$000's)



PERS DCR – FY20 Actuarial Gains/(Losses)

(\$000's)

	Occ D&D	Retiree Medical	Total
Actuarial Accrued Liabilities			
- Demographic Experience (non-mortality)	2,378	1,668	4,046
- Mortality Experience	1,775	243	2,018
- Salary Increases	(25)	n/a	(25)
- New Entrants/Rehires	(175)	(4,628)	(4,803)
- Per Capita Claims Cost	n/a	7,735	7,735
- COVID-19 Experience	n/a	128	128
- Elimination of 0.2% Annual Trend Rate Adjustment	n/a	(7,485)	(7,485)
- Miscellaneous*	<u>573</u>	<u>531</u>	<u>1,104</u>
- Total	4,526	(1,808)	2,718
Actuarial Value of Assets	(429)	(1,232)	(1,661)
Actual vs Expected Contributions	1,497	2,943	4,440
Actual vs Expected Admin Expenses	<u>1</u>	<u>(18)</u>	<u>(17)</u>
TOTAL	5,595	(115)	5,480

* Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories shown on this slide.

Valuation Results - TRS DCR

TRS DCR – Valuation Results (Occ D&D)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	240	538	223
Actuarial Value of Assets	4,359	4,997	4,933
Market Value of Assets	4,328	4,963	4,823
Unfunded Actuarial Accrued Liability*	(4,119)	(4,459)	(4,710)
Funded Ratio*	1,816.3%	928.8%	2,212.1%
Normal Cost (without loads)	284	not available	312
Employer Contribution Rate as of 6/30**			
- Normal Cost	0.08%	not available	0.08%
- Unfunded Liability Amortization	(0.09)%	not available	(0.10)%
- Total (not less than Normal Cost)	0.08%	not available	0.08%

* Based on Actuarial Value of Assets

** % of DCR payroll

TRS DCR – Valuation Results (Retiree Medical)

(\$000's)

	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	32,981	40,749	40,634
Actuarial Value of Assets	42,307	50,037	49,554
Market Value of Assets	42,067	49,780	48,413
Unfunded Actuarial Accrued Liability*	(9,326)	(9,288)	(8,920)
Funded Ratio*	128.3%	122.8%	122.0%
Normal Cost (without loads)	2,967	not available	3,388
Employer Contribution Rate as of 6/30**			
- Normal Cost	0.83%	not available	0.87%
- Unfunded Liability Amortization	(0.15)%	not available	(0.14)%
- Total (not less than Normal Cost)	0.83%	not available	0.87%

* Based on Actuarial Value of Assets

** % of DCR payroll

TRS DCR – Valuation Results (Total)

(\$000's)

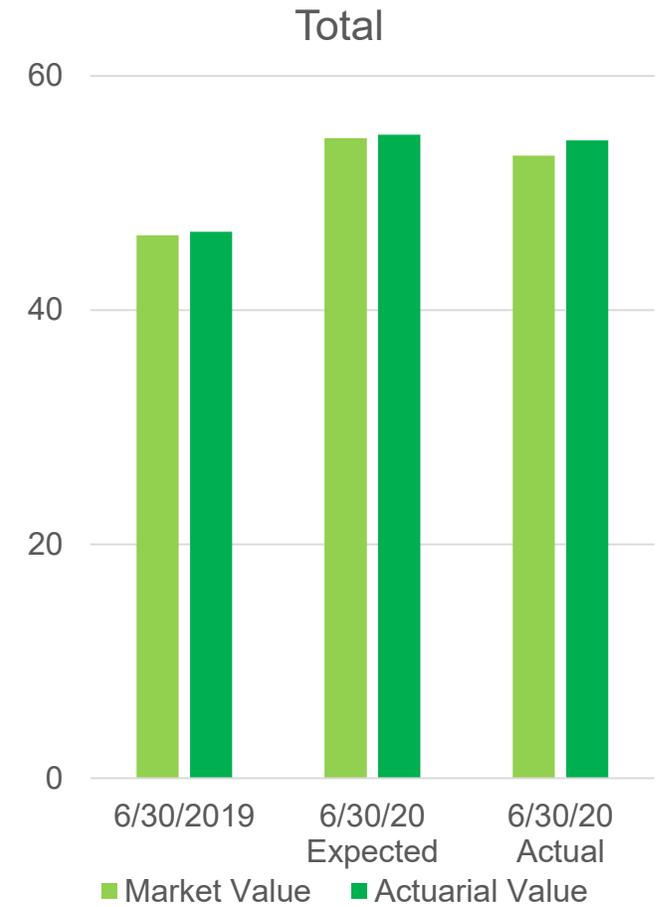
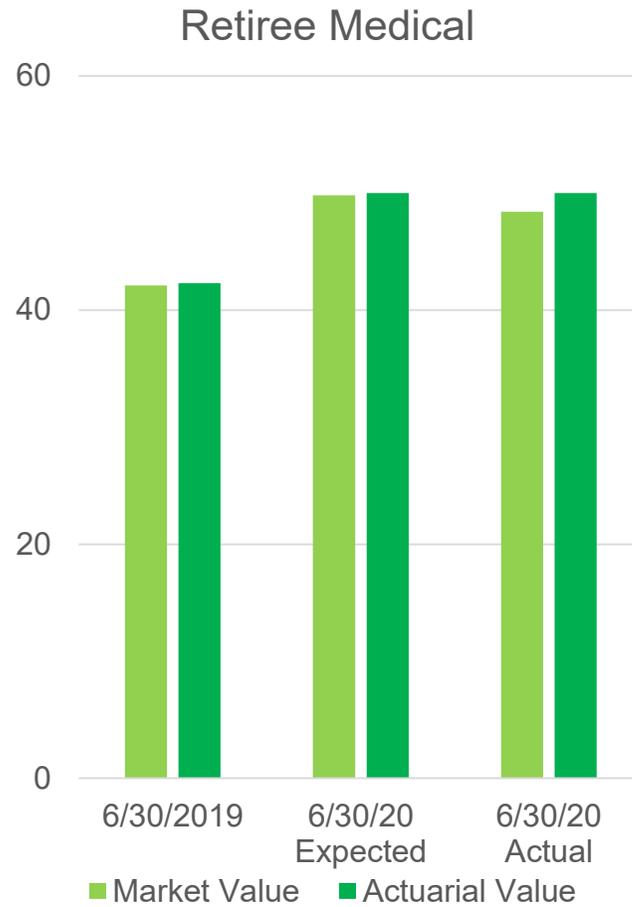
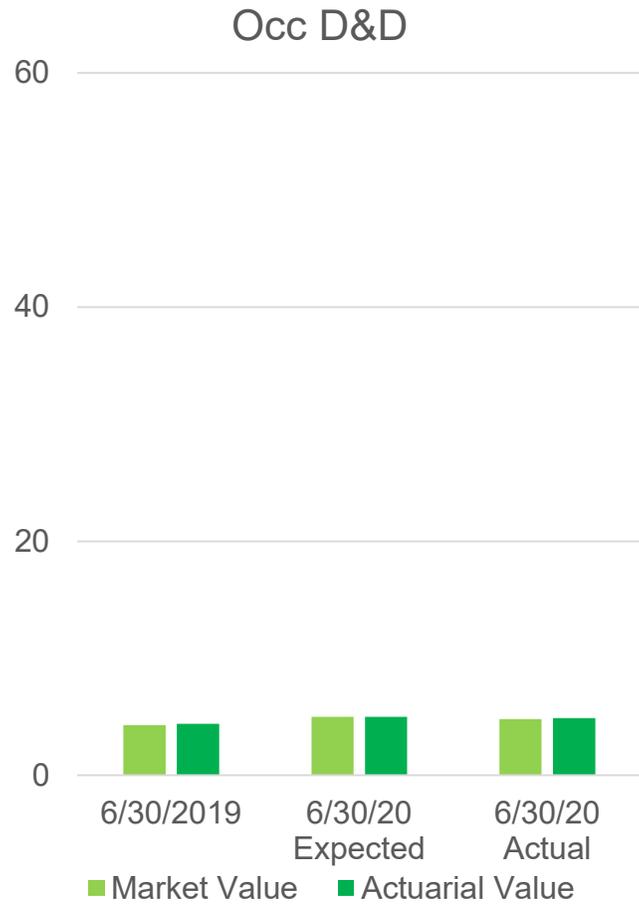
	6/30/19	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	33,221	41,287	40,857
Actuarial Value of Assets	46,666	55,034	54,487
Market Value of Assets	46,395	54,743	53,236
Unfunded Actuarial Accrued Liability*	(13,445)	(13,747)	(13,630)
Funded Ratio*	140.5%	133.3%	133.4%
Normal Cost (without loads)	3,251	not available	3,700
Employer Contribution Rate as of 6/30**			
- Normal Cost	0.91%	not available	0.95%
- Unfunded Liability Amortization	(0.24)%	not available	(0.24)%
- Total (not less than Normal Cost)	0.91%	not available	0.95%

* Based on Actuarial Value of Assets

** % of DCR payroll

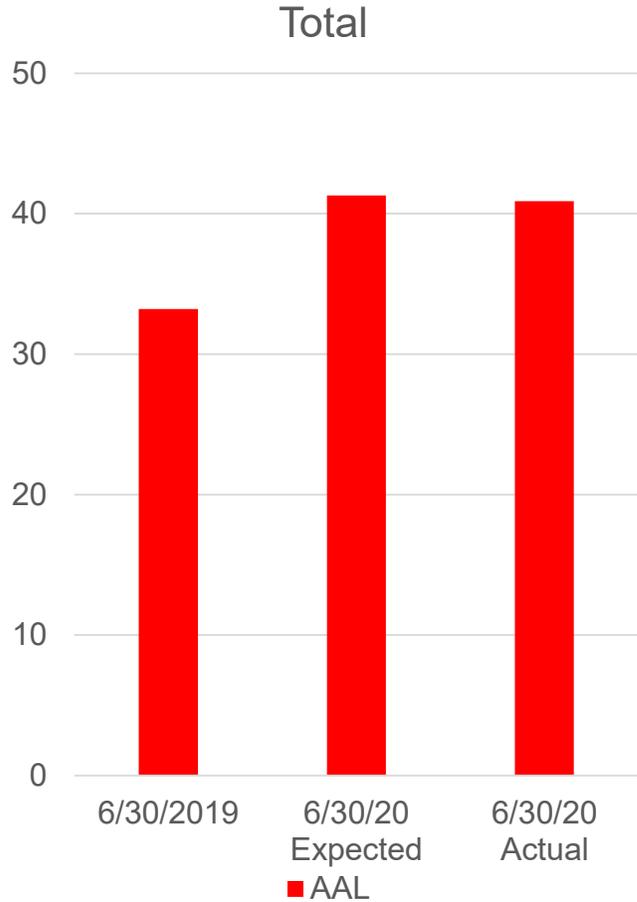
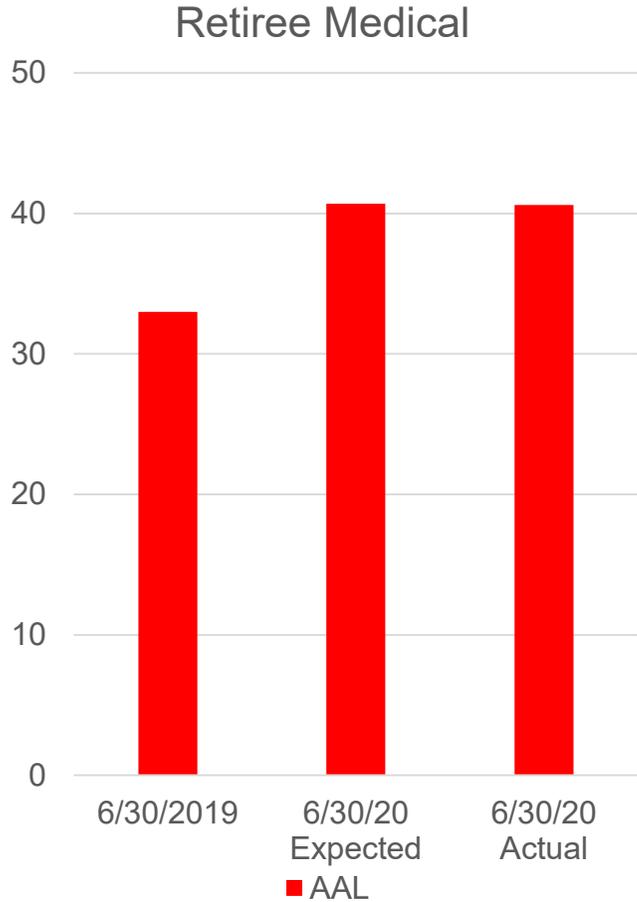
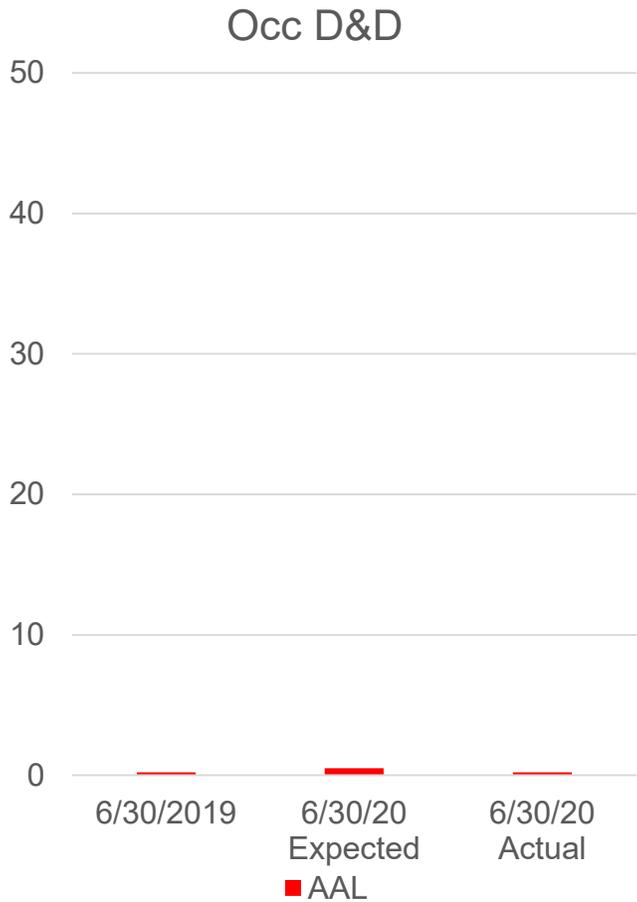
TRS DCR – Assets

(\$000's)



TRS DCR – Actuarial Accrued Liability

(\$000's)



TRS DCR – FY20 Actuarial Gains/(Losses)

(\$000's)

	Occ D&D	Retiree Medical	Total
Actuarial Accrued Liabilities			
- Demographic Experience (non-mortality)	195	963	1,158
- Mortality Experience	110	(50)	60
- Salary Increases	0	n/a	0
- New Entrants/Rehires	1	(2,809)	(2,808)
- Per Capita Claims Cost	n/a	2,130	2,130
- COVID-19 Experience	n/a	32	32
- Elimination of 0.2% Annual Trend Rate Adjustment	n/a	(2,153)	(2,153)
- Miscellaneous*	<u>9</u>	<u>(151)</u>	<u>(142)</u>
- Total	315	(2,038)	(1,723)
Actuarial Value of Assets	(64)	(483)	(547)
Actual vs Expected Contributions	386	2,027	2,413
Actual vs Expected Admin Expenses	<u>0</u>	<u>(4)</u>	<u>(4)</u>
TOTAL	637	(498)	139

* Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories shown on this slide.

Valuation Results - JRS

JRS – Valuation Results (Pension)

(\$000's)

	6/30/18	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	226,560	245,677	233,346
Actuarial Value of Assets	178,489	197,594	194,788
Market Value of Assets	176,795	195,992	189,844
Unfunded Actuarial Accrued Liability*	48,070	48,083	38,558
Funded Ratio*	78.8%	80.4%	83.5%
Normal Cost (without admin expense load)	6,351	not available	6,407
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	42.04%	not available	41.35%
- Unfunded Liability Amortization	35.78%	not available	34.11%
- Total (not less than Normal Cost)	77.82%	not available	75.46%

* Based on Actuarial Value of Assets

** % of JRS payroll

JRS – Valuation Results (Healthcare)

(\$000's)

	6/30/18	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	16,847	19,103	16,563
Actuarial Value of Assets	31,868	35,305	34,806
Market Value of Assets	31,498	35,060	34,037
Unfunded Actuarial Accrued Liability*	(15,021)	(16,202)	(18,243)
Funded Ratio*	189.2%	184.8%	210.1%
Normal Cost (without admin expense load)	801	not available	788
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	6.12%	not available	5.95%
- Unfunded Liability Amortization	(6.45)%	not available	(8.05)%
- Total (not less than Normal Cost)	6.12%	not available	5.95%

* Based on Actuarial Value of Assets

** % of JRS payroll

JRS – Valuation Results (Total)

(\$000's)

	6/30/18	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	243,407	264,780	249,909
Actuarial Value of Assets	210,357	232,899	229,594
Market Value of Assets	208,293	231,053	223,881
Unfunded Actuarial Accrued Liability*	33,049	31,881	20,315
Funded Ratio*	86.4%	88.0%	91.9%
Normal Cost (without admin expense load)	7,152	not available	7,195
Employer/State Contribution Rate as of 6/30**			
- Normal Cost (net of EE contributions)	48.16%	not available	47.30%
- Unfunded Liability Amortization	35.78%	not available	34.11%
- Total (not less than Normal Cost)	83.94%	not available	81.41%

* Based on Actuarial Value of Assets

** % of JRS payroll

JRS – Employer/State Contribution Rates

(% of JRS payroll)

	Pension	Healthcare	Total
As of 6/30/20 (for FY23)			
• Normal Cost	41.35%	5.95%	47.30%
• Unfunded Liability Amortization	<u>34.11%</u>	<u>0.00%</u>	<u>34.11%</u>
• Total	75.46%	5.95%	81.41%
As of 6/30/18 (for FY21)			
• Normal Cost	42.04%	6.12%	48.16%
• Unfunded Liability Amortization	<u>35.78%</u>	<u>0.00%</u>	<u>35.78%</u>
• Total	77.82%	6.12%	83.94%

JRS – FY19 and FY20 Actuarial Gains/(Losses)

(\$000's)

	Pension	Healthcare	Total
Actuarial Accrued Liabilities			
- Demographic Experience (non-mortality)	(1,053)	348	(705)
- Mortality Experience	1,468	422	1,890
- Salary Increases	(392)	n/a	(392)
- Inactive Benefit Increases	(361)	n/a	(361)
- New Entrants	(2,857)	(271)	(3,128)
- Per Capita Claims Cost	n/a	2,287	2,287
- Cadillac Tax Repeal	n/a	234	234
- Programming Changes	(297)	0	(297)
- Miscellaneous*	<u>(583)</u>	<u>(480)</u>	<u>(1,063)</u>
- Total	(4,075)	2,540	(1,535)
Actuarial Value of Assets	(6,000)	(1,122)	(7,122)
Actual vs Expected Contributions	1,117	1,568	2,685
Actual vs Expected Admin Expenses	<u>(30)</u>	<u>(5)</u>	<u>(35)</u>
TOTAL	(8,988)	2,981	(6,007)

* Includes the effects of various data changes that are typical when new census data is received for the valuation, the effects of differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories shown on this slide.

Valuation Results – NGNMRS

NGNMRS – Valuation Results

(\$000's)

	6/30/18	6/30/20 Expected	6/30/20 Actual
Actuarial Accrued Liability	21,934	22,989	22,417
Actuarial Value of Assets	41,031	43,824	43,020
Market Value of Assets	39,418	42,782	42,096
Unfunded Actuarial Accrued Liability/(Surplus)*	(19,097)	(20,835)	(20,603)
Funded Ratio*	187.1%	190.6%	191.9%
Normal Cost (without admin expense load)	484	not available	503
Employer Contribution as of 6/30			
- Normal Cost	726	not available	759
- Unfunded Liability Amortization	(2,989)	not available	(3,225)
- Total (not less than zero)	0	not available	0

* Based on Actuarial Value of Assets

Actuarial Certification

Actuarial Certification

The purpose of this presentation is to provide the ARMB Actuarial Committee with (i) June 30, 2020 valuation results and projections, and (ii) draft June 30, 2020 actuarial valuation reports for discussion at the March 17, 2021 meeting. This presentation should be considered part of the June 30, 2020 actuarial valuation report services.

The data, assumptions, methods, and plan provisions used to determine the results shown in this presentation are as shown in the draft June 30, 2020 valuation reports. These draft reports include detailed information related to potential risks associated with the plans (ASOP 51), and information regarding our use of models (ASOP 56).

Where presented, references to “funded ratio” and “unfunded actuarial accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded actuarial accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e., purchase annuities) all or a portion of its liabilities.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

The results were prepared under the direction of David Kershner and Scott Young, both of whom meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. These results have been prepared in accordance with all applicable Actuarial Standards of Practice.

David Kershner
FSA, EA, MAAA, FCA
Principal, Retirement

Scott Young
FSA, EA, MAAA
Director, Health

State of Alaska

Timeline for June 30, 2020 Valuations (PERS/TRS DB and DCR, JRS, NGNMRS)

Item #	Task	Original Deadline	Revised Deadline	Date Completed	Team Responsible	Comments / Notes
1	Enrollment Data Request to Aetna	7/15/20		7/9/20	Buck	Request was sent to Daniel Dudley at Aetna. Data received 7/20.
2	Valuation Data Request to DRB	7/17/20		7/17/20	Buck	
3	Monthly Audit Discussion with GRS / Buck	7/20/20	7/22/20	7/22/20	GRS / Buck	
4	Monthly Audit Discussion with GRS / Buck	8/17/20		not needed	GRS / Buck	
5	Preliminary 6/30/2020 Assets to Buck	8/19/20		8/10/20	DRB	These will be used only for the adoption of FY22 contribution rates.
6	Valuation Data to Buck	9/4/20		9/4/20	DRB	PERS/TRS/JRS data files received by Buck were forwarded to GRS on 9/17. NGNMRS data received on 10/20 (and forwarded to GRS on 10/23).
7	Audit Data and Sample Lives Request to Buck	9/15/20		9/18/20	GRS	
8	Actuarial Committee Meeting - FY22 Contribution Rates	9/16/20		9/16/20	All	Teleconference.
9	Monthly Audit Discussion with GRS / Buck	9/21/20		9/21/20	GRS / Buck	
10	Claims Data Request to Segal/DRB	9/25/20		8/27/20	Buck	To include claims through 6/30/20 that are paid through 8/31/20.
11	Data Questions to DRB	9/25/20		10/2/20	Buck	Data questions sent 9/29 (PERS), 10/2 (TRS/JRS), 11/19 (NGNMRS).
12	Final 6/30/2020 Assets to Buck	10/8/20	10/23/20	10/30/20	DRB	These will be used for the 6/30/20 valuations.
13	Data Answers to Buck	10/9/20		10/14/20	DRB	Responses to data questions received 10/12 (PERS), 10/13 (JRS), 10/14 (TRS), 12/8 (NGNMRS).
14	Monthly Audit Discussion with GRS / Buck	10/19/20	10/23/20	10/23/20	GRS / Buck	
15	TRS (and selected school districts in PERS) updated active listing at 10/1/20 to capture term/rehires since 6/30/20	10/19/20			DRB	Won't be reflected in 6/30/20 valuations, but DRB still wants Buck to track how many terms/rehires by plan.
16	Claims Data to Buck	10/21/20	9/21/20	10/5/20	Segal / DRB	Include claims through 6/30/20 that are paid through 8/31/20.
17	6/30/2020 Valuation Data and DRB Data Questions to GRS	10/30/20		11/5/20	Buck	Pension provided on 10/30; OPEB provided on 11/5. NGNMRS provided on 2/5.
18	Sample Life Information to GRS	11/6/20		11/12/20	Buck	Sample lives (other than JRS and OPEB) provided on 11/6; OPEB provided on 11/12; JRS provided on 11/13. NGNMRS provided on 2/5 (updated on 2/26).
19	Preliminary Valuation Results and PVB's by individual to GRS	11/13/20		11/13/20	Buck	PERS/TRS provided on 11/13. JRS provided on 12/10. NGNMRS provided on 2/26.
20	Monthly Audit Discussion with GRS / Buck	11/16/20		11/16/20	GRS / Buck	
21	Actuarial Committee Meeting - 6/30/20 valuation results (preliminary)	12/2/20		12/2/20	All	Teleconference. PERS, TRS, PERS DCR and TRS DCR only.
22	Monthly Audit Discussion with GRS / Buck	12/21/20		canceled	GRS / Buck	
23	Draft DCR Valuation Reports to GRS	1/8/21		1/7/21	Buck	
24	Monthly Audit Discussion with GRS / Buck	1/18/21	1/20/21	1/20/21	GRS / Buck	
25	Draft DB Valuation Reports to GRS	1/22/21		1/22/21	Buck	JRS provided on 2/23. NGNMRS provided on 2/26.
26	Monthly Audit Discussion with GRS / Buck	2/15/21	2/17/21	2/17/21	GRS / Buck	
27	Draft Actuarial Review Report to Buck	2/28/21		2/26/21	GRS	GRS provided findings from their sample life review on 2/3 (no major issues were identified...changes to be reflected in 2021 valuations).
28	Monthly Audit Discussion with GRS / Buck	3/15/21			GRS / Buck	
29	Actuarial Committee Meeting - 6/30/20 valuation results (full) and draft valuation reports	3/17/21			All	Teleconference. JRS/NGNMRS valuation results and 2020 valuation baseline projections will also be provided.
30	Monthly Audit Discussion with GRS / Buck	4/19/21			GRS / Buck	
31	Actuarial Committee Meeting - follow-up to March meeting (if needed)	4/29/21			All	Teleconference or Juneau TBD.
32	Monthly Audit Discussion with GRS / Buck	5/17/21			GRS / Buck	
33	Actuarial Committee Meeting - final valuation reports	6/16/21			All	Teleconference or Juneau TBD.

Note: All deadline and completion dates are specific to PERS/TRS.



State of Alaska

Public Employees' Retirement System

Actuarial Valuation Report
As of June 30, 2020

January 2021

DRAFT



January 22, 2021

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Public Employees' Retirement System (PERS) as of June 30, 2020 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2020. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under PERS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of PERS as of June 30, 2020.

PERS is funded by Employer, State, and Member Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board) and as required by Alaska state statutes. The funding objective for PERS is to pay required contributions that remain level as a percent of total PERS compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability (UAAL) as a level percentage of total PERS compensation over a closed 25-year period as required by Alaska state statutes. The closed 25-year period was originally established effective June 30, 2014. Effective June 30, 2018, the Board adopted a 25-year layered UAAL amortization method as described in Section 5.2. The UAAL amortization continues to be on a level percent of pay basis. The compensation used to determine required contributions is the total compensation of all active members in PERS, including those hired after July 1, 2006 who are members of the Defined Contribution Retirement (DCR) Plan. This objective is currently being met and is projected to continue to be met. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status (on a combined pension/healthcare basis) is expected to increase to 100% in FY38.

The Board and staff of the State of Alaska may use this report for the review of the operations of PERS. Use of this report, for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claim cost rates effective June 30, 2020 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 5.2 and 5.3.

Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67) was effective for PERS beginning with fiscal year ending June 30, 2014, and Statement No. 74 (GASB 74) was effective for PERS beginning with fiscal year ending June 30, 2017. Separate GASB 67 and GASB 74 reports as of June 30, 2020 have been prepared. We have also prepared the member data tables shown in Section 4 of this report for the Statistical Section of the CAFR, as well as the summary of actuarial assumptions and analysis of financial experience for the Actuarial Section of the CAFR. Please see our separate GASB 67 and GASB 74 reports for other information needed for the CAFR.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the healthcare portion of PERS. See Section 6 of this report for further details regarding ASOP 51.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies

to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Additional models used in valuing health benefits are described later in the report.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. A more detailed explanation on these adjustments is shown in Section 5.2.

This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

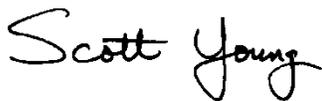
I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,



David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

Contents

Executive Summary	1
Section 1: Actuarial Funding Results	8
Section 1.1: Actuarial Liabilities and Normal Cost	8
Section 1.2: Actuarial Contributions as of June 30, 2020	14
Section 1.3: Roll-Forward Contribution Rate Calculation for FY23	20
Section 1.4: Actuarial Gain/(Loss) for FY20	23
Section 1.5: Development of Change in Unfunded Liability During FY20	24
Section 1.6: Analysis of Financial Experience	25
Section 1.7: History of Unfunded Liability and Funded Ratio	28
Section 2: Plan Assets	29
Section 2.1: Summary of Fair Value of Assets	29
Section 2.2: Changes in Fair Value of Assets During FY20	30
Section 2.3: Development of Actuarial Value of Assets	31
Section 2.4: Historical Asset Rates of Return	33
Section 3: Projections	34
Section 3.1: Projection Assumptions and Methods	34
Section 3.2: Membership Projection	35
Section 3.3: Projected Employer/State Contribution Rates	38
Section 3.4: Projected Employer/State Contribution Amounts	39
Section 3.5: Projection of Funded Ratios	40
Section 3.6: Table of Projected Actuarial Results	41
Section 3.7: Projected Pension Benefit Recipients and Amounts	43
Section 4: Member Data	44
Section 4.1: Summary of Members Included	44
Section 4.2: Age and Service Distribution of Active Members	49
Section 4.3: Member Data Reconciliation	51
Section 4.4: Schedule of Active Member Data	53
Section 4.5: Active Member Payroll Reconciliation	54
Section 4.6: Summary of New Pension Benefit Recipients	55
Section 4.7: Summary of All Pension Benefit Recipients	59
Section 4.8: Pension Benefit Recipients by Type of Benefit and Option Elected	64
Section 4.9: Pension Benefit Recipients Added to and Removed from Rolls	66

Section 5: Basis of the Actuarial Valuation	68
Section 5.1: Summary of Plan Provisions.....	68
Section 5.2: Description of Actuarial Methods and Valuation Procedures	75
Section 5.3: Summary of Actuarial Assumptions.....	82
Section 6: Actuarial Standard of Practice No. 51	95
Glossary of Terms	99

DRAFT

Executive Summary

Overview

The State of Alaska Public Employees' Retirement System (PERS) provides pension and postemployment healthcare benefits to eligible participants. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of PERS as of the valuation date of June 30, 2020.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer/State contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of PERS based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Actuarial projections are also performed to provide a long-term view of the expected future funded status and contribution patterns (see Section 3). The future funded status and contribution patterns would be different than those shown in Section 3 if future experience does not match the actuarial assumptions used in the projections.

Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30 (\$'s in 000's)**2019****2020****Pension**

a. Actuarial Accrued Liability	\$ 15,039,180	\$ 15,279,525
b. Valuation Assets	<u>9,576,693</u>	<u>9,713,710</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 5,462,487	\$ 5,565,815
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	63.7%	63.6%
e. Fair Value of Assets	\$ 9,489,405	\$ 9,469,161
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	63.1%	62.0%

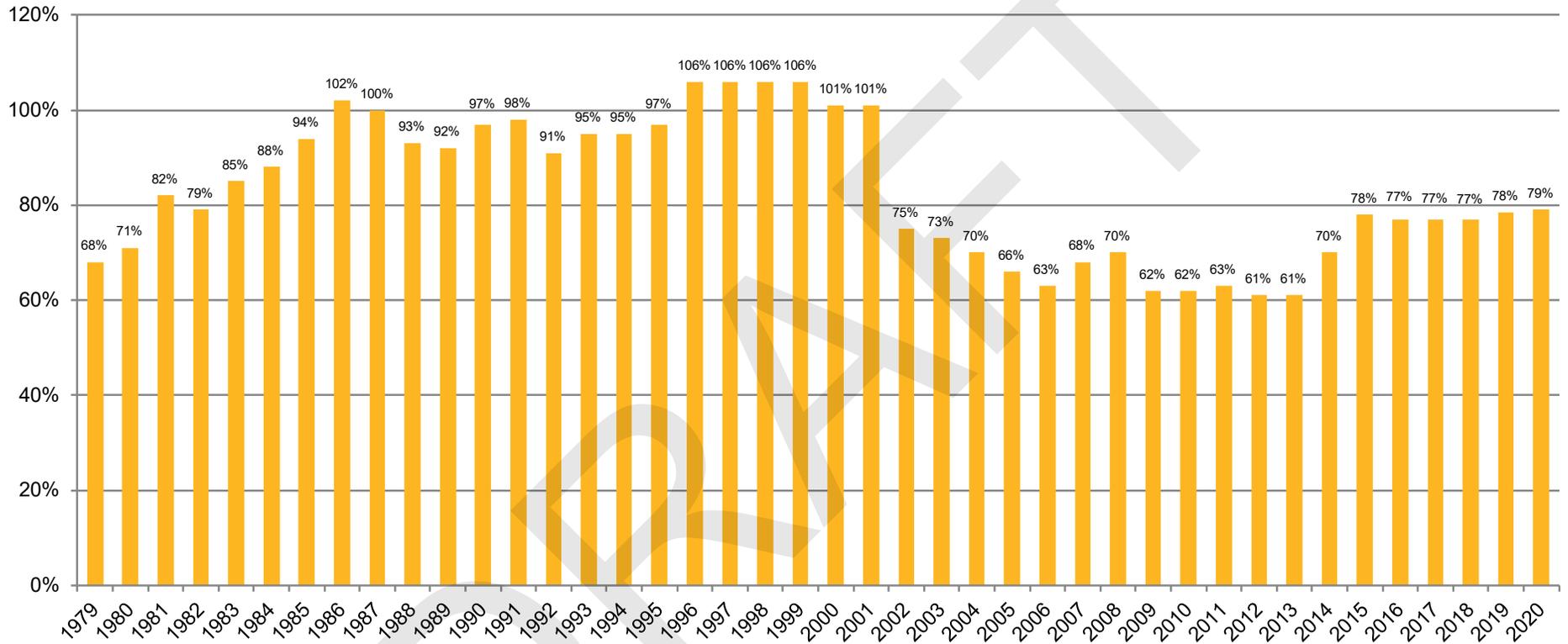
Healthcare

a. Actuarial Accrued Liability	\$ 7,151,694	\$ 7,036,550
b. Valuation Assets	<u>7,810,491</u>	<u>7,989,358</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (658,797)	\$ (952,808)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	109.2%	113.5%
e. Fair Value of Assets	\$ 7,767,692	\$ 7,813,511
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	108.6%	111.0%

Total

a. Actuarial Accrued Liability	\$ 22,190,874	\$ 22,316,075
b. Valuation Assets	<u>17,387,184</u>	<u>17,703,068</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 4,803,690	\$ 4,613,007
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	78.4%	79.3%
e. Fair Value of Assets	\$ 17,257,097	\$ 17,282,672
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	77.8%	77.4%

Funded Ratio History (Based on Valuation Assets)



The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions, so there is potential for actuarial gains or losses.

1. Investment Experience

The actuarial asset value was reinitialized to equal fair value of assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the investment gain or loss each year, for a period of five years. The FY20 investment return based on fair value of assets was approximately 4.1% compared to the expected investment return of 7.38% (net of investment expenses of approximately 0.29%). This resulted in a market asset loss of approximately \$556 million. Due to the recognition of investment gains and losses over a 5-year period, the FY20 investment return based on actuarial value of assets was approximately 5.8%, which resulted in an actuarial asset loss of approximately \$275 million.

2. Salary Increases

Salary increases for continuing active members during FY20 were less than expected based on the valuation assumptions, resulting in a liability gain of approximately \$11 million.

3. Demographic Experience

Section 4 provides statistics on active and inactive participants. The number of active participants decreased 9.2% from 12,152 at June 30, 2019 to 11,033 at June 30, 2020 due to active members exiting the plan during the year (due to retirement, termination, death, and disability) and the closure of the plan to new entrants as of July 1, 2006. The average age of active participants increased from 52.84 to 53.21 and average credited service increased from 17.80 to 18.38 years.

The number of benefit recipients increased 2.2% from 36,310 to 37,106 and their average age increased from 70.29 to 70.77. The number of vested terminated participants decreased 3.1% from 5,499 to 5,327. Their average age increased from 53.06 to 53.52.

The overall effect of the demographic experience during FY20 was a liability loss of approximately \$13.5 million (pension) and a liability gain of approximately \$27.6¹ million (healthcare).

4. COLA / PRPA Experience

The cost-of-living increases (COLA) for benefit recipients during FY20 were less than expected based on the valuation assumptions, resulting in a liability gain of approximately \$5 million. The postretirement pension adjustments (PRPA) were also less than expected, resulting in a liability gain of approximately \$74 million.

5. Retiree Medical Claims Experience

As described in Section 5.2, recent medical claims experience and changes in healthcare enrollment data provided to us for the June 30, 2020 valuation generated a liability gain of approximately \$280 million. The decrease in retired member contributions from CY20 to CY21 generated a liability loss of approximately \$1 million. Reduced claims during FY20, largely attributable to COVID-19, generated a liability gain of approximately \$26 million.

6. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

¹ Includes the effects of changes in dependent coverage elections and Medicare Part B only experience.

7. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. Retired member contributions were updated to reflect the 5% decrease from CY20 to CY21. The amounts included in the Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

8. Changes in Benefit Provisions Since the Prior Valuation

There have been no changes in benefit provisions valued since the prior valuation.

Comparative Summary of Contribution Rates

Pension	Actual FY 2022	Estimated FY 2023
a. Normal Cost Rate Net of Member Contributions	2.58%	2.37%
b. Past Service Cost Rate	<u>18.31%</u>	<u>18.53%</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a) ¹	20.89%	20.90%

Healthcare	Actual FY 2022	Estimated FY 2023
a. Normal Cost Rate	3.12%	2.84%
b. Past Service Cost Rate	<u>(1.80%)</u>	<u>(2.95%)</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a) ¹	3.12%	2.84%

Total	Actual FY 2022	Estimated FY 2023
a. Normal Cost Rate Net of Member Contributions	5.70%	5.21%
b. Past Service Cost Rate	<u>18.31%</u>	<u>18.53%</u>
c. Total Employer/State Contribution Rate, (a) + (b) ¹	24.01%	23.74%
d. Board Adopted Total Employer/State Contribution Rate	24.01%	TBD
e. Defined Contribution Retirement (DCR) Rate Paid by Employers	<u>6.10%</u>	<u>6.41%</u>
f. Board Adopted Total Rate, Including DCR Rate Paid by Employers, (d) + (e)	30.11%	TBD

Contribution rates are based on total (DB and DCR) payroll. The contribution rates shown above for FY23 are estimated assuming no actuarial gains/losses during FY21 and FY22. Actual FY23 contribution rates will be adopted by the Board in September 2021 reflecting FY21 asset experience.

Contribution rates include Employer contribution rates as limited by Alaska state statutes and the Additional State Contribution required under SB 125.

¹ Beginning with the June 30, 2014 valuation, contribution rates for FY17 and beyond are determined using new methodology in accordance with 2014 legislation under HB 385 and SB 119, 2014 Alaska Laws, which changed the amortization methodology to a closed 25-year period as a level percentage of pay, and eliminated the time lag on the contribution rate calculation by using a 2-year "roll-forward" approach assuming 0% population growth. Investment gains and losses are recognized over a 5-year period beginning in FY15. Beginning with the June 30, 2018 valuation, the UAAL amortization was changed as described in Section 5.2.

Summary of Actuarial Accrued Liability Gain/(Loss) and Other Changes During the Year

The following table summarizes the sources of change in the total Employer/State contribution rate as of June 30, 2019 and June 30, 2020 based on DB and DCR payroll combined:

	Pension	Healthcare	Total
1. Total Employer/State Contribution Rate as of June 30, 2019	20.17%	3.91%	24.08%
2. Change due to:			
a. Health Claims Experience	N/A	(0.87)%	(0.87)%
b. Salary Increases	(0.03)%	N/A	(0.03)%
c. Investment Experience	0.44%	0.31%	0.75%
d. Demographic Experience and Miscellaneous ¹	(0.19)%	0.38%	0.19%
e. Contribution Lag	0.15%	(0.16)%	(0.01)%
f. Assumption Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
g. Total Change, (a) + (b) + (c) + (d) + (e) + (f)	0.37%	(0.34)%	0.03%
3. Total Employer/State Contribution Rate as of June 30, 2020, (1) + (2)(g)	20.54%	3.57%	24.11%

The following table shows the FY20 gain/(loss) on actuarial accrued liability as of June 30, 2020 (\$'s in 000's):

	Pension	Healthcare	Total
Retirement Experience	\$ (1,285)	\$ 4,857	\$ 3,572
Termination Experience	(4,857)	(8,049)	(12,906)
Disability Experience	(901)	867	(34)
Active Mortality Experience	4,182	(1,942)	2,240
Inactive Mortality Experience	(10,603)	2,098	(8,505)
Salary Increases	11,228	N/A	11,228
Rehires (Net of Rehire Load)	8,418	15,996	24,414
COLA Increases	4,618	N/A	4,618
PRPA Increases	74,177	N/A	74,177
Per Capita Claims Cost	N/A	278,796	278,796
COVID-19 Experience	N/A	25,856	25,856
Medicare Part B Only Experience	N/A	6,345	6,345
Changes in Dependent Coverage Elections	N/A	23,400	23,400
Programming Changes ²	1,406	N/A	1,406
Miscellaneous ³	<u>4,429</u>	<u>1,735</u>	<u>6,164</u>
Total	\$ 90,812	\$ 349,959	\$ 440,771

¹ Includes the effects of census data changes between the two valuations.

² Includes adjustments to (a) the 75% PRPA for occupational disabilities to commence immediately, and (b) the mortality applied during the COLA deferral period for Tier 2 and Tier 3 members.

³ Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories.

The rehire gain/(loss) amount shown on the previous page is the difference between (i) the increase in Actuarial Accrued Liability at June 30, 2020 due to rehires during the most recent plan year, and (ii) the load that was added to the June 30, 2019 Normal Cost based on the rehire load assumption used in the June 30, 2019 valuation. The development of the FY20 rehire gain/(loss) amount is shown in the table below (\$'s in 000's):

	Pension	Healthcare	Total
1. Increase/(Decrease) in Actuarial Accrued Liability at June 30, 2020 due to Rehires	\$ 15,604	\$ (2,208)	\$ 13,396
2. June 30, 2019 Normal Cost Rehire Load, with interest to June 30, 2020	\$ 24,022	\$ 13,788	\$ 37,810
3. Rehire Gain/(Loss), (2) - (1)	\$ 8,418	\$ 15,996	\$ 24,414

Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

Peace Officer / Firefighter

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	\$ 910,930	\$ 804,294
Termination Benefits	11,914	3,012
Disability Benefits	1,623	(1,092)
Death Benefits	9,747	6,259
Return of Contributions	1,488	(4,535)
Medical and Prescription Drug Benefits	381,738	322,960
Medicare Part D Subsidy	(29,887)	(25,342)
Indebtedness	(4,523)	(4,523)
Subtotal	\$ 1,283,030	\$ 1,101,033
Inactive Members		
Not Vested	\$ 2,182	\$ 2,182
Vested Terminations		
- Retirement Benefits	36,707	36,707
- Medical and Prescription Drug Benefits	94,212	94,212
- Medicare Part D Subsidy	(8,751)	(8,751)
- Indebtedness	(456)	(456)
Retirees & Beneficiaries		
- Retirement Benefits	1,649,532	1,649,532
- Medical and Prescription Drug Benefits	565,479	565,479
- Medicare Part D Subsidy	(70,192)	(70,192)
Subtotal	\$ 2,268,713	\$ 2,268,713
Total	\$ 3,551,743	\$ 3,369,746
Total Pension	\$ 2,619,144	\$ 2,491,380
Total Medical, Net of Part D Subsidy	\$ 932,599	\$ 878,366
Total Medical, Gross of Part D Subsidy	\$ 1,041,429	\$ 982,651

Peace Officer / Firefighter

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	\$ 1,024,529	\$ 1,023,595
- Medical, Net of Part D Subsidy	289,357	288,756
Tier 2		
- Pension	681,171	666,070
- Medical, Net of Part D Subsidy	265,578	259,844
Tier 3		
- Pension	913,444	801,715
- Medical, Net of Part D Subsidy	377,664	329,766
Total	\$ 3,551,743	\$ 3,369,746

As of June 30, 2020	Normal Cost
Active Members	
Retirement Benefits	\$ 19,111
Termination Benefits	1,657
Disability Benefits	504
Death Benefits	667
Return of Contributions	1,101
Medical and Prescription Drug Benefits	10,290
Medicare Part D Subsidy	(817)
Rehire Assumption (Pension)	4,325
Rehire Assumption (Medical)	1,619
Administrative Expenses (Pension)	1,514
Administrative Expenses (Medical)	685
Total	\$ 40,656
Total Pension	\$ 28,879
Total Medical, Net of Part D Subsidy	\$ 11,777
Total Medical, Gross of Part D Subsidy	\$ 12,594

By Tier	
Tier 1	
- Pension	\$ 403
- Medical, Net of Part D Subsidy	268
Tier 2	
- Pension	4,680
- Medical, Net of Part D Subsidy	1,722
Tier 3	
- Pension	23,796
- Medical, Net of Part D Subsidy	9,787
Total	\$ 40,656

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

Others

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	\$ 3,493,134	\$ 3,166,630
Termination Benefits	229,771	129,112
Disability Benefits	18,314	5,330
Death Benefits	48,513	37,843
Return of Contributions	15,235	(31,403)
Medical and Prescription Drug Benefits	2,008,284	1,628,239
Medicare Part D Subsidy	(234,813)	(195,996)
Indebtedness	<u>(42,238)</u>	<u>(42,238)</u>
Subtotal	\$ 5,536,200	\$ 4,697,517
Inactive Members		
Not Vested	\$ 72,950	\$ 72,950
Vested Terminations		
- Retirement Benefits	639,590	639,590
- Medical and Prescription Drug Benefits	943,124	943,124
- Medicare Part D Subsidy	(95,182)	(95,182)
- Indebtedness	(12,603)	(12,603)
Retirees & Beneficiaries		
- Retirement Benefits	8,822,934	8,822,934
- Medical and Prescription Drug Benefits	4,541,099	4,541,099
- Medicare Part D Subsidy	<u>(663,100)</u>	<u>(663,100)</u>
Subtotal	\$ 14,248,812	\$ 14,248,812
Total	\$ 19,785,012	\$ 18,946,329
Total Pension	\$ 13,285,600	\$ 12,788,145
Total Medical, Net of Part D Subsidy	\$ 6,499,412	\$ 6,158,184
Total Medical, Gross of Part D Subsidy	\$ 7,492,507	\$ 7,112,462

Others

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	\$ 6,221,260	\$ 6,190,548
- Medical, Net of Part D Subsidy	2,523,052	2,493,840
Tier 2		
- Pension	3,753,099	3,647,096
- Medical, Net of Part D Subsidy	1,929,059	1,854,613
Tier 3		
- Pension	3,311,241	2,950,501
- Medical, Net of Part D Subsidy	2,047,301	1,809,731
Total	\$ 19,785,012	\$ 18,946,329

As of June 30, 2020	Normal Cost
Active Members	
Retirement Benefits	\$ 59,753
Termination Benefits	15,548
Disability Benefits	2,123
Death Benefits	1,912
Return of Contributions	7,577
Medical and Prescription Drug Benefits	65,545
Medicare Part D Subsidy	(6,788)
Rehire Assumption (Pension)	16,314
Rehire Assumption (Medical)	10,042
Administrative Expenses (Pension)	5,709
Administrative Expenses (Medical)	4,249
Total	\$ 181,984
Total Pension	\$ 108,936
Total Medical, Net of Part D Subsidy	\$ 73,048
Total Medical, Gross of Part D Subsidy	\$ 79,836

By Tier	
Tier 1	
- Pension	\$ 10,986
- Medical, Net of Part D Subsidy	10,177
Tier 2	
- Pension	27,012
- Medical, Net of Part D Subsidy	18,171
Tier 3	
- Pension	70,938
- Medical, Net of Part D Subsidy	44,700
Total	\$ 181,984

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

All Members

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	\$ 4,404,064	\$ 3,970,924
Termination Benefits	241,685	132,124
Disability Benefits	19,937	4,238
Death Benefits	58,260	44,102
Return of Contributions	16,723	(35,938)
Medical and Prescription Drug Benefits	2,390,022	1,951,199
Medicare Part D Subsidy	(264,700)	(221,338)
Indebtedness	<u>(46,761)</u>	<u>(46,761)</u>
Subtotal	\$ 6,819,230	\$ 5,798,550
Inactive Members		
Not Vested	\$ 75,132	\$ 75,132
Vested Terminations		
- Retirement Benefits	676,297	676,297
- Medical and Prescription Drug Benefits	1,037,336	1,037,336
- Medicare Part D Subsidy	(103,933)	(103,933)
- Indebtedness	(13,059)	(13,059)
Retirees & Beneficiaries		
- Retirement Benefits	10,472,466	10,472,466
- Medical and Prescription Drug Benefits	5,106,578	5,106,578
- Medicare Part D Subsidy	<u>(733,292)</u>	<u>(733,292)</u>
Subtotal	\$ 16,517,525	\$ 16,517,525
Total	\$ 23,336,755	\$ 22,316,075
Total Pension	\$ 15,904,744	\$ 15,279,525
Total Medical, Net of Part D Subsidy	\$ 7,432,011	\$ 7,036,550
Total Medical, Gross of Part D Subsidy	\$ 8,533,936	\$ 8,095,113

All Members

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	\$ 7,245,789	\$ 7,214,143
- Medical, Net of Part D Subsidy	2,812,409	2,782,596
Tier 2		
- Pension	4,434,270	4,313,166
- Medical, Net of Part D Subsidy	2,194,637	2,114,457
Tier 3		
- Pension	4,224,685	3,752,216
- Medical, Net of Part D Subsidy	2,424,965	2,139,497
Total	\$ 23,336,755	\$ 22,316,075

As of June 30, 2020	Normal Cost
Active Members	
Retirement Benefits	\$ 78,864
Termination Benefits	17,205
Disability Benefits	2,627
Death Benefits	2,579
Return of Contributions	8,678
Medical and Prescription Drug Benefits	75,835
Medicare Part D Subsidy	(7,605)
Rehire Assumption (Pension)	20,639
Rehire Assumption (Medical)	11,661
Administrative Expenses (Pension)	7,223
Administrative Expenses (Medical)	4,934
Total	\$ 222,640
Total Pension	\$ 137,815
Total Medical, Net of Part D Subsidy	\$ 84,825
Total Medical, Gross of Part D Subsidy	\$ 92,430

By Tier	
Tier 1	
- Pension	\$ 11,389
- Medical, Net of Part D Subsidy	10,445
Tier 2	
- Pension	31,692
- Medical, Net of Part D Subsidy	19,893
Tier 3	
- Pension	94,734
- Medical, Net of Part D Subsidy	54,487
Total	\$ 222,640

Section 1.2: Actuarial Contributions as of June 30, 2020 (\$'s in 000's)

Peace Officer / Firefighter

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	\$ 28,879	\$ 11,777	\$ 40,656
2. DB Rate Payroll Projected for FY21	159,555	159,555	159,555
3. DCR Rate Payroll Projected for FY21	203,314	203,314	203,314
4. Total Rate Payroll Projected for FY21	362,869	362,869	362,869
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	18.10%	7.38%	25.48%
b. Based on Total Rate Payroll, (1) ÷ (4)	7.96%	3.25%	11.20%
6. Average Member Contribution Rate	3.30%	0.00%	3.30%
7. Employer Normal Cost, (5)(b) - (6)	4.66%	3.25%	7.90%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	\$ 2,491,380	\$ 878,366	\$ 3,369,746
2. Valuation Assets ¹	1,583,854	997,304	2,581,158
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ 907,526	\$ (118,938)	\$ 788,588
4. Funded Ratio, (2) ÷ (1)	63.6%	113.5%	76.6%
5. Past Service Cost Amortization Payment	67,273	(8,061)	59,212
6. Total Rate Payroll Projected for FY21	362,869	362,869	362,869
7. Past Service Rate, (5) ÷ (6)	18.54%	(2.22%)	18.54%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	23.20%	3.25%	26.45%

Normal Cost Rate by Tier (Total Employer and Member)²

Tier 1	20.26%	13.47%	33.73%
Tier 2	17.69%	6.51%	24.20%
Tier 3	18.15%	7.46%	25.61%

¹ Allocated between Peace Officer / Firefighter and Others in proportion to Actuarial Accrued Liability

² Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Pension (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 731,232	\$ 725,301	\$ 55,139
Experience Study	6/30/2018	23	88,162	88,810	6,010
FY19 Loss	6/30/2019	24	61,980	62,257	4,112
FY20 Loss	6/30/2020	25	31,158	31,158	2,012
Total				\$ 907,526	\$ 67,273

Schedule of Past Service Cost Amortizations - Healthcare (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ (30,991)	\$ (30,740)	\$ (2,337)
Experience Study and EGWP	6/30/2018	23	27,556	27,759	1,879
FY19 Gain	6/30/2019	24	(77,575)	(77,921)	(5,147)
FY20 Gain	6/30/2020	25	(38,036)	(38,036)	(2,456)
Total				\$ (118,938)	\$ (8,061)

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 700,241	\$ 694,561	\$ 52,802
Experience Study and EGWP	6/30/2018	23	115,718	116,569	7,889
FY19 Gain	6/30/2019	24	(15,595)	(15,664)	(1,035)
FY20 Gain	6/30/2020	25	(6,878)	(6,878)	(444)
Total				\$ 788,588	\$ 59,212

Section 1.2: Actuarial Contributions as of June 30, 2020 (\$'s in 000's)

Others

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	\$ 108,936	\$ 73,048	\$ 181,984
2. DB Rate Payroll Projected for FY21	770,506	770,506	770,506
3. DCR Rate Payroll Projected for FY21	1,239,703	1,239,703	1,239,703
4. Total Rate Payroll Projected for FY21	2,010,209	2,010,209	2,010,209
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	14.14%	9.48%	23.62%
b. Based on Total Rate Payroll, (1) ÷ (4)	5.42%	3.63%	9.05%
6. Average Member Contribution Rate	2.62%	0.00%	2.62%
7. Employer Normal Cost, (5)(b) - (6)	2.80%	3.63%	6.43%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	\$ 12,788,145	\$ 6,158,184	\$ 18,946,329
2. Valuation Assets ¹	8,129,856	6,992,054	15,121,910
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ 4,658,289	\$ (833,870)	\$ 3,824,419
4. Funded Ratio, (2) ÷ (1)	63.6%	113.5%	79.8%
5. Past Service Cost Amortization Payment	346,776	(55,136)	291,640
6. Total Rate Payroll Projected for FY21	2,010,209	2,010,209	2,010,209
7. Past Service Rate, (5) ÷ (6)	17.25%	(2.74%)	17.25%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	20.05%	3.63%	23.68%

Normal Cost Rate by Tier (Total Employer and Member)²

Tier 1	17.82%	16.51%	34.33%
Tier 2	13.22%	8.89%	22.11%
Tier 3	14.06%	8.86%	22.92%

¹ Allocated between Peace Officer / Firefighter and Others in proportion to Actuarial Accrued Liability

² Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

Others

Schedule of Past Service Cost Amortizations - Pension (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 3,889,167	\$ 3,857,623	\$ 293,264
Experience Study	6/30/2018	23	467,280	470,714	31,856
FY19 Loss	6/30/2019	24	235,559	236,609	15,629
FY20 Loss	6/30/2020	25	93,343	93,343	6,027
Total				\$ 4,658,289	\$ 346,776

Schedule of Past Service Cost Amortizations - Healthcare (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ (47,263)	\$ (46,880)	\$ (3,564)
Experience Study and EGWP	6/30/2018	23	22,293	22,456	1,519
FY19 Gain	6/30/2019	24	(553,265)	(555,735)	(36,708)
FY20 Gain	6/30/2020	25	(253,711)	(253,711)	(16,383)
Total				\$ (833,870)	\$ (55,136)

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 3,841,904	\$ 3,810,743	\$ 289,700
Experience Study and EGWP	6/30/2018	23	489,573	493,170	33,375
FY19 Gain	6/30/2019	24	(317,706)	(319,126)	(21,079)
FY20 Gain	6/30/2020	25	(160,368)	(160,368)	(10,356)
Total				\$ 3,824,419	\$ 291,640

Section 1.2: Actuarial Contributions as of June 30, 2020 (\$'s in 000's)

All Members

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	\$ 137,815	\$ 84,825	\$ 222,640
2. DB Rate Payroll Projected for FY21	930,061	930,061	930,061
3. DCR Rate Payroll Projected for FY21	1,443,017	1,443,017	1,443,017
4. Total Rate Payroll Projected for FY21	2,373,078	2,373,078	2,373,078
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	14.82%	9.12%	23.94%
b. Based on Total Rate Payroll, (1) ÷ (4)	5.81%	3.57%	9.38%
6. Average Member Contribution Rate ¹	2.72%	0.00%	2.72%
7. Employer Normal Cost, (5)(b) - (6)	3.09%	3.57%	6.66%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	\$ 15,279,525	\$ 7,036,550	\$ 22,316,075
2. Valuation Assets	9,713,710	7,989,358	17,703,068
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ 5,565,815	\$ (952,808)	\$ 4,613,007
4. Funded Ratio, (2) ÷ (1)	63.6%	113.5%	79.3%
5. Past Service Cost Amortization Payment	414,049	(63,197)	350,852
6. Total Rate Payroll Projected for FY21	2,373,078	2,373,078	2,373,078
7. Past Service Rate, (5) ÷ (6)	17.45%	(2.66%)	17.45%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	20.54%	3.57%	24.11%

Normal Cost Rate by Tier (Total Employer and Member)²

Tier 1	17.90%	16.41%	34.31%
Tier 2	13.73%	8.62%	22.35%
Tier 3	14.91%	8.57%	23.48%

¹ 7.5% for Peace Officer / Firefighter and 6.82% weighted average for Others

² Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

All Members

Schedule of Past Service Cost Amortizations - Pension (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 4,620,399	\$ 4,582,924	\$ 348,403
Experience Study	6/30/2018	23	555,442	559,524	37,866
FY19 Loss	6/30/2019	24	297,539	298,866	19,741
FY20 Loss	6/30/2020	25	124,501	124,501	8,039
Total				\$ 5,565,815	\$ 414,049

Schedule of Past Service Cost Amortizations - Healthcare (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ (78,254)	\$ (77,620)	\$ (5,901)
Experience Study and EGWP	6/30/2018	23	49,849	50,215	3,398
FY19 Gain	6/30/2019	24	(630,840)	(633,656)	(41,855)
FY20 Gain	6/30/2020	25	(291,747)	(291,747)	(18,839)
Total				\$ (952,808)	\$ (63,197)

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 4,542,145	\$ 4,505,304	\$ 342,502
Experience Study and EGWP	6/30/2018	23	605,291	609,739	41,264
FY19 Gain	6/30/2019	24	(333,301)	(334,790)	(22,114)
FY20 Gain	6/30/2020	25	(167,246)	(167,246)	(10,800)
Total				\$ 4,613,007	\$ 350,852

Section 1.3: Roll-Forward Contribution Rate Calculation for FY23 (\$'s in 000's)

	Pension	Healthcare	Total
1. Liability Roll Forward			
a. Actuarial Accrued Liability as of June 30, 2020	\$ 15,279,525	\$ 7,036,550	\$ 22,316,075
b. Normal Cost	130,592	79,891	210,483
c. Interest on (a) and (b) at 7.38%	1,137,267	525,193	1,662,460
d. Estimated Benefit Payments	(944,242)	(408,057)	(1,352,299)
e. Interest on (d) at 7.38%, adjusted for timing	<u>(37,130)</u>	<u>(14,789)</u>	<u>(51,919)</u>
f. Expected Actuarial Accrued Liability as of June 30, 2021	\$ 15,566,012	\$ 7,218,788	\$ 22,784,800
g. Projected Normal Cost	117,140	71,782	188,922
h. Interest on (f) and (g) at 7.38%	1,157,417	538,044	1,695,461
i. Estimated Benefit Payments	(992,490)	(428,722)	(1,421,212)
j. Interest on (i) at 7.38%, adjusted for timing	<u>(39,027)</u>	<u>(15,538)</u>	<u>(54,565)</u>
k. Expected Actuarial Accrued Liability as of June 30, 2022	\$ 15,809,052	\$ 7,384,354	\$ 23,193,406
2. Asset Roll Forward			
a. Actuarial Value of Assets as of June 30, 2020	\$ 9,713,710	\$ 7,989,358	\$ 17,703,068
b. Interest on (a) at 7.38%	716,872	589,615	1,306,487
c. Employee Contributions	70,747	0	70,747
d. Employer Contributions	285,481	96,110	381,591
e. State Assistance Contributions	203,585	0	203,585
f. Interest on (c) thru (e) at 7.38%, adjusted for timing*	27,935	3,483	31,418
g. Estimated Benefit Payments	(944,242)	(408,057)	(1,352,299)
h. Administrative Expenses	(7,223)	(4,934)	(12,157)
i. Interest on (g) and (h) at 7.38%, adjusted for timing	(37,391)	(14,968)	(52,359)
j. AVA Adjustments	<u>(25,173)</u>	<u>(7,721)</u>	<u>(32,894)</u>
k. Expected Actuarial Value of Assets as of June 30, 2021	\$ 10,004,301	\$ 8,242,886	\$ 18,247,187
l. Interest on (k) at 7.38%	738,317	608,325	1,346,642
m. Employee Contributions	65,590	0	65,590
n. Employer Contributions	305,011	74,463	379,474
o. State Assistance Contributions**	193,494	0	193,494
p. Interest on (m) thru (o) at 7.38%, adjusted for timing*	27,712	2,699	30,411
q. Estimated Benefit Payments	(992,490)	(428,722)	(1,421,212)
r. Administrative Expenses	(6,531)	(4,466)	(10,997)
s. Interest on (q) and (r) at 7.38%, adjusted for timing	(39,264)	(15,700)	(54,964)
t. AVA Adjustments	<u>(103,367)</u>	<u>(76,343)</u>	<u>(179,710)</u>
u. Expected Actuarial Value of Assets as of June 30, 2022	\$ 10,192,773	\$ 8,403,142	\$ 18,595,915
3. Expected Unfunded Actuarial Accrued Liability as of June 30, 2022, 1(k) - 2(u)			
	\$ 5,616,279	\$ (1,018,788)	\$ 4,597,491

* Employee and Employer Contributions are paid throughout the year. State Assistance Contributions are assumed to be paid on July 1, 2020 for FY21, and July 1, 2021 for FY22.

** The FY22 State Assistance Contribution is expected to be contributed 100% to pension.

	Pension	Healthcare	Total
4. Expected Annual Rate Payroll for FY23			
a. Defined Benefit Members			\$ 774,572
b. Defined Contribution Retirement Members			1,630,504
c. Total Rate Payroll			\$ 2,405,076
5. Expected FY23 Contribution Rate Calculation			
a. Projected Normal Cost for FY23	\$ 110,560	\$ 68,351	\$ 178,911
b. Projected Normal Cost Rate for FY23	4.60%	2.84%	7.44%
c. Expected Member Contribution Rate for FY23	(2.23%)	0.00%	(2.23%)
d. Expected Employer Normal Cost Rate for FY23	2.37%	2.84%	5.21%
e. Expected Unfunded Liability as of June 30, 2022	\$ 5,616,279	\$ (1,018,788)	\$ 4,597,491
f. FY23 Layered Amortization of Expected Unfunded Liability	445,759	(70,873)	374,886
g. Expected Past Service Cost Contribution Rate for FY23	18.53%	(2.95%)	18.53%
h. Expected Total Contribution Rate for FY23, not less than Normal Cost Rate	20.90%	2.84%	23.74%

The components of the expected FY23 amortization amounts are shown below (totals may not add due to rounding):

Expected FY23 Schedule of Past Service Cost Amortizations - Pension (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment for FY23
	Date Created	Years Remaining as of June 30, 2022	Initial	Outstanding as of June 30, 2022	
Initial Amount	6/30/2018	17	\$ 4,620,399	\$ 4,498,197	\$ 367,828
Experience Study	6/30/2018	21	555,442	559,718	39,977
FY19 Loss	6/30/2019	22	297,539	300,063	20,841
FY20 Loss	6/30/2020	23	124,501	125,417	8,488
Expected FY21 Loss	6/30/2021	24	29,744	29,876	1,973
Expected FY22 Loss	6/30/2022	25	103,008	103,008	6,652
Total				\$ 5,616,279	\$ 445,759

Expected FY23 Schedule of Past Service Cost Amortizations - Healthcare (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment for FY23
	Date Created	Years Remaining as of June 30, 2022	Initial	Outstanding as of June 30, 2022	
Initial Amount	6/30/2018	17	\$ (78,254)	\$ (76,185)	\$ (6,230)
Experience Study and EGWP	6/30/2018	21	49,849	50,232	3,588
FY19 Gain	6/30/2019	22	(630,840)	(636,194)	(44,188)
FY20 Gain	6/30/2020	23	(291,747)	(293,891)	(19,889)
Expected FY21 Gain	6/30/2021	24	(68,832)	(69,140)	(4,567)
Expected FY22 Loss	6/30/2022	25	6,390	6,390	413
Total				\$ (1,018,788)	\$ (70,873)

Expected FY23 Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment for FY23
	Date Created	Years Remaining as of June 30, 2022	Initial	Outstanding as of June 30, 2022	
Initial Amount	6/30/2018	17	\$ 4,542,145	\$ 4,422,012	\$ 361,598
Experience Study and EGWP	6/30/2018	21	605,291	609,950	43,565
FY19 Gain	6/30/2019	22	(333,301)	(336,131)	(23,347)
FY20 Gain	6/30/2020	23	(167,246)	(168,474)	(11,401)
Expected FY21 Gain	6/30/2021	24	(39,088)	(39,264)	(2,594)
Expected FY22 Loss	6/30/2022	25	109,398	109,398	7,065
Total				\$ 4,597,491	\$ 374,886

Section 1.4: Actuarial Gain/(Loss) for FY20 (\$'s in 000's)

	Pension	Healthcare	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2019	\$ 15,039,180	\$ 7,151,694	\$ 22,190,874
b. Normal Cost	141,556	87,971	229,527
c. Interest on (a) and (b) at 7.38%	1,120,338	534,287	1,654,625
d. Employer Group Waiver Plan	0	33,177	33,177
e. Benefit Payments	(885,252)	(407,069)	(1,292,321)
f. Refund of Contributions	(10,271)	0	(10,271)
g. Interest on (d) thru (f) at 7.38%, adjusted for timing	(35,214)	(13,551)	(48,765)
h. Assumptions/Methods Changes	0	0	0
i. Expected Actuarial Accrued Liability as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$ 15,370,337	\$ 7,386,509	\$ 22,756,846
2. Actual Actuarial Accrued Liability as of June 30, 2020	15,279,525	7,036,550	22,316,075
3. Liability Gain/(Loss), (1)(i) - (2)	\$ 90,812	\$ 349,959	\$ 440,771
4. Expected Actuarial Asset Value			
a. Actuarial Value of Assets as of June 30, 2019	\$ 9,576,693	\$ 7,810,491	\$ 17,387,184
b. Interest on (a) at 7.38%	706,760	576,414	1,283,174
c. Employee Contributions	74,514	0	74,514
d. Employer Contributions	270,460	107,298	377,758
e. State Assistance Contributions	159,055	0	159,055
f. Employer Group Waiver Plan	0	33,177	33,177
g. Interest on (c) thru (f) at 7.38%, adjusted for timing	24,241	5,091	29,332
h. Benefit Payments	(885,252)	(407,069)	(1,292,321)
i. Refund of Contributions	(10,271)	0	(10,271)
j. Administrative Expenses	(7,017)	(6,203)	(13,220)
k. Interest on (h) thru (j) at 7.38%, adjusted for timing	(35,468)	(14,978)	(50,446)
l. Expected Actuarial Asset Value as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) + (k)	\$ 9,873,715	\$ 8,104,221	\$ 17,977,936
5. Actual Actuarial Asset Value as of June 30, 2020	9,713,710	7,989,358	17,703,068
6. Actuarial Asset Value Gain/(Loss), (5) - (4)(l)	\$ (160,005)	\$ (114,863)	\$ (274,868)
7. Total Actuarial Gain/(Loss), (3) + (6)	\$ (69,193)	\$ 235,096	\$ 165,903
8. Contribution Gain/(Loss)	\$ (55,380)	\$ 59,059	\$ 3,679
9. Administrative Expense Gain/(Loss)	\$ 72	\$ (2,408)	\$ (2,336)
10. FY20 Gain/(Loss), (7) + (8) + (9)	\$ (124,501)	\$ 291,747	\$ 167,246

Section 1.5: Development of Change in Unfunded Liability During FY20 (\$'s in 000's)

	Pension	Healthcare	Total
1. 2019 Unfunded Liability	\$ 5,462,487	\$ (658,797)	\$ 4,803,690
a. Interest on Unfunded Liability at 7.38%	\$ 403,132	\$ (48,619)	\$ 354,513
b. Normal Cost	141,556	87,971	229,527
c. Employee Contributions	(74,514)	0	(74,514)
d. Employer Contributions	(270,460)	(107,298)	(377,758)
e. State Assistance Contributions	(159,055)	0	(159,055)
f. Administrative Expenses	7,017	6,203	13,220
g. Interest on (b) thru (f) at 7.38%, adjusted for timing	(13,541)	2,828	(10,713)
h. Assumptions/Methods Changes	0	0	0
i. Expected Change in Unfunded Liability During FY20 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$ 34,135	\$ (58,915)	\$ (24,780)
2. Expected 2020 Unfunded Liability, (1) + (1)(i)	\$ 5,496,622	\$ (717,712)	\$ 4,778,910
a. Liability (Gain)/Loss During FY20	\$ (90,812)	\$ (349,959)	\$ (440,771)
b. Actuarial Assets (Gain)/Loss During FY20	160,005	114,863	274,868
c. Total Actuarial (Gain)/Loss During FY20	\$ 69,193	\$ (235,096)	\$ (165,903)
3. Actual 2020 Unfunded Liability, (2) + (2)(c)	\$ 5,565,815	\$ (952,808)	\$ 4,613,007

Section 1.6: Analysis of Financial Experience

Pension

**Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience**

Type of (Gain) or Loss	Change in Employer / State Contribution Rate During Fiscal Year				
	Pension				
	2016	2017	2018	2019	2020
1. Health Claims	N/A	N/A	N/A	N/A	N/A
2. Salary Experience	(0.20%)	(0.36%)	(0.30%)	0.16%	(0.03%)
3. Investment Experience	0.73%	0.64%	0.52%	0.50%	0.44%
4. Demographic Experience and Miscellaneous	(0.33%)	(0.19%)	0.26%	(0.45%)	(0.19%)
5. Contribution Lag	<u>0.16%</u>	<u>0.15%</u>	<u>0.14%</u>	<u>0.11%</u>	<u>0.15%</u>
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	0.36%	0.24%	0.62%	0.32%	0.37%
7. Assumptions / Method Changes	1.00%	0.00%	1.65%	0.00%	0.00%
8. System Benefit Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	1.36%	0.24%	2.27%	0.32%	0.37%
10. Beginning Total Employer / State Contribution Rate	<u>15.98%</u>	<u>17.34%</u>	<u>17.58%</u>	<u>19.85%</u>	<u>20.17%</u>
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	17.34%	17.58%	19.85%	20.17%	20.54%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	18.27%	18.29%	20.66%	20.89%	20.90% *
b. Fiscal Year for which Rate Applies	FY19	FY20	FY21	FY22	FY23

* Expected rate. Actual rate to be determined

Healthcare

**Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience**

Type of (Gain) or Loss	Change in Employer / State Contribution Rate During Fiscal Year				
	Healthcare				
	2016	2017	2018	2019	2020
1. Health Claims ¹	0.59%	(2.46%)	(1.51%)	(2.39%)	(0.87%)
2. Salary Experience	N/A	N/A	N/A	N/A	N/A
3. Investment Experience	0.60%	0.51%	0.40%	0.38%	0.31%
4. Demographic Experience and Miscellaneous	0.00%	(0.48%)	(1.08%)	1.16%	0.38%
5. Contribution Lag	<u>(0.41%)</u>	<u>(0.12%)</u>	<u>0.06%</u>	<u>0.02%</u>	<u>(0.16%)</u>
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	0.78%	(2.55%)	(2.13%)	(0.83%)	(0.34%)
7. Assumptions / Method Changes	0.50%	2.89%	2.20%	0.00%	0.00%
8. System Benefit Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	1.28%	0.34%	0.07%	(0.83%)	(0.34%)
10. Beginning Total Employer / State Contribution Rate	<u>3.05%</u>	<u>4.33%</u>	<u>4.67%</u>	<u>4.74%</u>	<u>3.91%</u>
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	4.33%	4.67%	4.74%	3.91%	3.57%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	4.37%	4.89%	4.27%	3.12%	2.84% *
b. Fiscal Year for which Rate Applies	FY19	FY20	FY21	FY22	FY23

* Expected rate. Actual rate to be determined

¹ The 2016 health claims percentage includes the effect of healthcare demographic experience gain/loss

Total
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

Type of (Gain) or Loss	Change in Employer / State Contribution Rate During Fiscal Year				
	2016	2017	2018	2019	2020
1. Health Claims ¹	0.59%	(2.46%)	(1.51%)	(2.39%)	(0.87%)
2. Salary Experience	(0.20%)	(0.36%)	(0.30%)	0.16%	(0.03%)
3. Investment Experience	1.33%	1.15%	0.92%	0.88%	0.75%
4. Demographic Experience and Miscellaneous	(0.33%)	(0.67%)	(0.82%)	0.71%	0.19%
5. Contribution Lag	<u>(0.25%)</u>	<u>0.03%</u>	<u>0.20%</u>	<u>0.13%</u>	<u>(0.01%)</u>
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	1.14%	(2.31%)	(1.51%)	(0.51%)	0.03%
7. Assumptions / Method Changes	1.50%	2.89%	3.85%	0.00%	0.00%
8. System Benefit Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	2.64%	0.58%	2.34%	(0.51%)	0.03%
10. Beginning Total Employer / State Contribution Rate	<u>19.03%</u>	<u>21.67%</u>	<u>22.25%</u>	<u>24.59%</u>	<u>24.08%</u>
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	21.67%	22.25%	24.59%	24.08%	24.11%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	22.64%	23.18%	24.93%	24.01%	23.74% *
b. Fiscal Year for which Rate Applies	FY19	FY20	FY21	FY22	FY23

* Expected rate. Actual rate to be determined

¹ The 2016 health claims percentage includes the effect of healthcare demographic experience gain/loss

Section 1.7: History of Unfunded Liability and Funded Ratio (\$'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2003	\$ 10,561,653	\$ 7,687,281	72.8%	\$ 2,874,372
June 30, 2004	11,443,916	8,030,414	70.2%	3,413,502
June 30, 2005	12,844,841	8,442,919	65.7%	4,401,922
June 30, 2006	14,388,413	9,040,908	62.8%	5,347,505
June 30, 2007	14,570,933	9,900,960	68.0%	4,669,973
June 30, 2008	15,888,141	11,040,106	69.5%	4,848,035
June 30, 2009	16,579,371	10,242,978	61.8%	6,336,393
June 30, 2010	18,132,492	11,157,464	61.5%	6,975,028
June 30, 2011	18,740,550	11,813,774	63.0%	6,926,776
June 30, 2012	19,292,361	11,832,030	61.3%	7,460,331
June 30, 2013	19,992,759	12,162,626	60.8%	7,830,133
June 30, 2014	20,897,372	14,644,598	70.1%	6,252,774
June 30, 2015	20,648,663	16,173,459	78.3%	4,475,204
June 30, 2016	21,369,490	16,467,992	77.1%	4,901,498
June 30, 2017	21,881,395	16,786,771	76.7%	5,094,624
June 30, 2018	22,264,137	17,116,701	76.9%	5,147,436
June 30, 2019	22,190,874	17,387,184	78.4%	4,803,690
June 30, 2020	22,316,075	17,703,068	79.3%	4,613,007

Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets (\$'s in 000's)

As of June 30, 2020	Pension	Healthcare	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	\$ 104,417	\$ 77,183	\$ 181,600	1.1%
- Subtotal	\$ 104,417	\$ 77,183	\$ 181,600	1.1%
Fixed Income Investments				
- Domestic Fixed Income Pool	\$ 2,047,425	\$ 1,701,267	\$ 3,748,692	21.6%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	\$ 2,047,425	\$ 1,701,267	\$ 3,748,692	21.6%
Equity Investments				
- Domestic Equity Pool	\$ 2,578,937	\$ 2,142,999	\$ 4,721,936	27.3%
- International Equity Pool	1,471,536	1,222,791	2,694,327	15.6%
- Private Equity Pool	1,166,939	969,682	2,136,621	12.3%
- Emerging Markets Equity Pool	307,716	255,700	563,416	3.3%
- Alternative Equity Strategies	513,333	426,560	939,893	5.4%
- Subtotal	\$ 6,038,461	\$ 5,017,732	\$ 11,056,193	63.9%
Other Investments				
- Real Estate Pool	\$ 580,860	\$ 483,662	\$ 1,064,522	6.1%
- Other Investments Pool	695,398	577,850	1,273,248	7.3%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	15	967	982	0.0%
- Subtotal	\$ 1,276,273	\$ 1,062,479	\$ 2,338,752	13.4%
Total Cash and Investments	\$ 9,466,576	\$ 7,858,661	\$ 17,325,237	100.0%
Net Accrued Receivables	2,585	(45,150)	(42,565)	
Net Assets	\$ 9,469,161	\$ 7,813,511	\$ 17,282,672	

Section 2.2: Changes in Fair Value of Assets During FY20 (\$'s in 000's)

Fiscal Year 2020	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2019	\$ 9,489,405	\$ 7,767,692	\$ 17,257,097
2. Additions:			
a. Employee Contributions	\$ 74,514	\$ 0	\$ 74,514
b. Employer Contributions	270,460	107,298	377,758
c. State Assistance Contributions	159,055	0	159,055
d. Interest and Dividend Income	144,330	118,959	263,289
e. Net Appreciation / Depreciation in Fair Value of Investments	261,863	221,506	483,369
f. Employer Group Waiver Plan	0	33,177	33,177
g. Other	148	458	606
h. Total Additions	\$ 910,370	\$ 481,398	\$ 1,391,768
3. Deductions:			
a. Medical Benefits	\$ 0	\$ 407,069	\$ 407,069
b. Retirement Benefits	885,252	0	885,252
c. Refund of Contributions	10,271	0	10,271
d. Investment Expenses	28,074	22,307	50,381
e. Administrative Expenses	7,017	6,203	13,220
f. Total Deductions	\$ 930,614	\$ 435,579	\$ 1,366,193
4. Fair Value of Assets as of June 30, 2020	\$ 9,469,161	\$ 7,813,511	\$ 17,282,672
5. Approximate Fair Value Investment Return Rate during FY20 Net of Investment Expenses	4.1%	4.2%	4.1%

Section 2.3: Development of Actuarial Value of Assets (\$'s in 000's)

The actuarial value of asset was set equal to the fair value as of June 30, 2014 and the 20% corridor was eliminated. Investment gains and losses after June 30, 2014 are recognized 20% per year over 5 years.

	Pension	Healthcare	Total
1. Deferral of Investment Gain / (Loss) for FY20			
a. Fair Value of Assets as of June 30, 2019	\$ 9,489,405	\$ 7,767,692	\$ 17,257,097
b. Contributions	504,029	107,298	611,327
c. Employer Group Waiver Plan	0	33,177	33,177
d. Benefit Payments	895,523	407,069	1,302,592
e. Administrative Expenses	7,017	6,203	13,220
f. Actual Investment Return (net of investment expenses)	378,267	318,616	696,883
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return, Weighted for Timing	689,091	563,369	1,252,460
i. Investment Gain / (Loss) for the Year, (f) - (h)	(310,824)	(244,753)	(555,577)
2. Actuarial Value as of June 30, 2020			
a. Fair Value as of June 30, 2020	\$ 9,469,161	\$ 7,813,511	\$ 17,282,672
b. Deferred Investment Gain / (Loss)	(244,549)	(175,847)	(420,396)
c. Actuarial Value as of June 30, 2020, (a) - (b)	9,713,710	7,989,358	17,703,068
3. Ratio of Actuarial Value of Assets to Fair Value of Assets			
	102.6%	102.3%	102.4%
4. Approximate Actuarial Value Investment Return Rate during FY20 Net of Investment Expenses			
	5.7%	5.9%	5.8%

The tables below show the development of the gains/(losses) to be recognized in the current year (\$'s in 000's):

Pension				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (732,190)	\$ (585,752)	\$ (146,438)	\$ 0
June 30, 2017	393,607	236,163	78,721	78,723
June 30, 2018	17,834	7,134	3,567	7,133
June 30, 2019	(136,242)	(27,248)	(27,248)	(81,746)
June 30, 2020	<u>(310,824)</u>	<u>0</u>	<u>(62,165)</u>	<u>(248,659)</u>
Total	\$ (767,815)	\$ (369,703)	\$ (153,563)	\$ (244,549)

Healthcare				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (584,781)	\$ (467,824)	\$ (116,957)	\$ 0
June 30, 2017	341,151	204,690	68,230	68,231
June 30, 2018	30,997	12,398	6,199	12,400
June 30, 2019	(101,128)	(20,226)	(20,226)	(60,676)
June 30, 2020	<u>(244,753)</u>	<u>0</u>	<u>(48,951)</u>	<u>(195,802)</u>
Total	\$ (558,514)	\$ (270,962)	\$ (111,705)	\$ (175,847)

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (1,316,971)	\$ (1,053,576)	\$ (263,395)	\$ 0
June 30, 2017	734,758	440,853	146,951	146,954
June 30, 2018	48,831	19,532	9,766	19,533
June 30, 2019	(237,370)	(47,474)	(47,474)	(142,422)
June 30, 2020	<u>(555,577)</u>	<u>0</u>	<u>(111,116)</u>	<u>(444,461)</u>
Total	\$ (1,326,329)	\$ (640,665)	\$ (265,268)	\$ (420,396)

Section 2.4: Historical Asset Rates of Return

Year Ending	Actuarial Value		Fair Value	
	Annual	Cumulative*	Annual	Cumulative*
June 30, 2005	8.7%	8.7%	8.5%	8.5%
June 30, 2006	9.3%	9.0%	11.4%	9.9%
June 30, 2007	11.6%	9.9%	18.5%	12.7%
June 30, 2008	10.0%	9.9%	(3.1%)	8.5%
June 30, 2009	(7.3%)	6.2%	(20.5%)	2.0%
June 30, 2010	7.2%	6.4%	10.2%	3.3%
June 30, 2011	7.2%	6.5%	20.4%	5.6%
June 30, 2012	1.2%	5.8%	0.2%	4.9%
June 30, 2013	4.0%	5.6%	12.1%	5.7%
June 30, 2014	21.9%	7.1%	18.1%	6.9%
June 30, 2015	7.0%	7.1%	2.9%	6.5%
June 30, 2016	5.0%	6.9%	(0.7%)	5.9%
June 30, 2017	5.4%	6.8%	12.8%	6.4%
June 30, 2018	6.1%	6.8%	8.2%	6.5%
June 30, 2019	5.5%	6.7%	6.0%	6.5%
June 30, 2020	5.8%	6.6%	4.1%	6.3%

* Cumulative since fiscal year ending June 30, 2005

Section 3: Projections

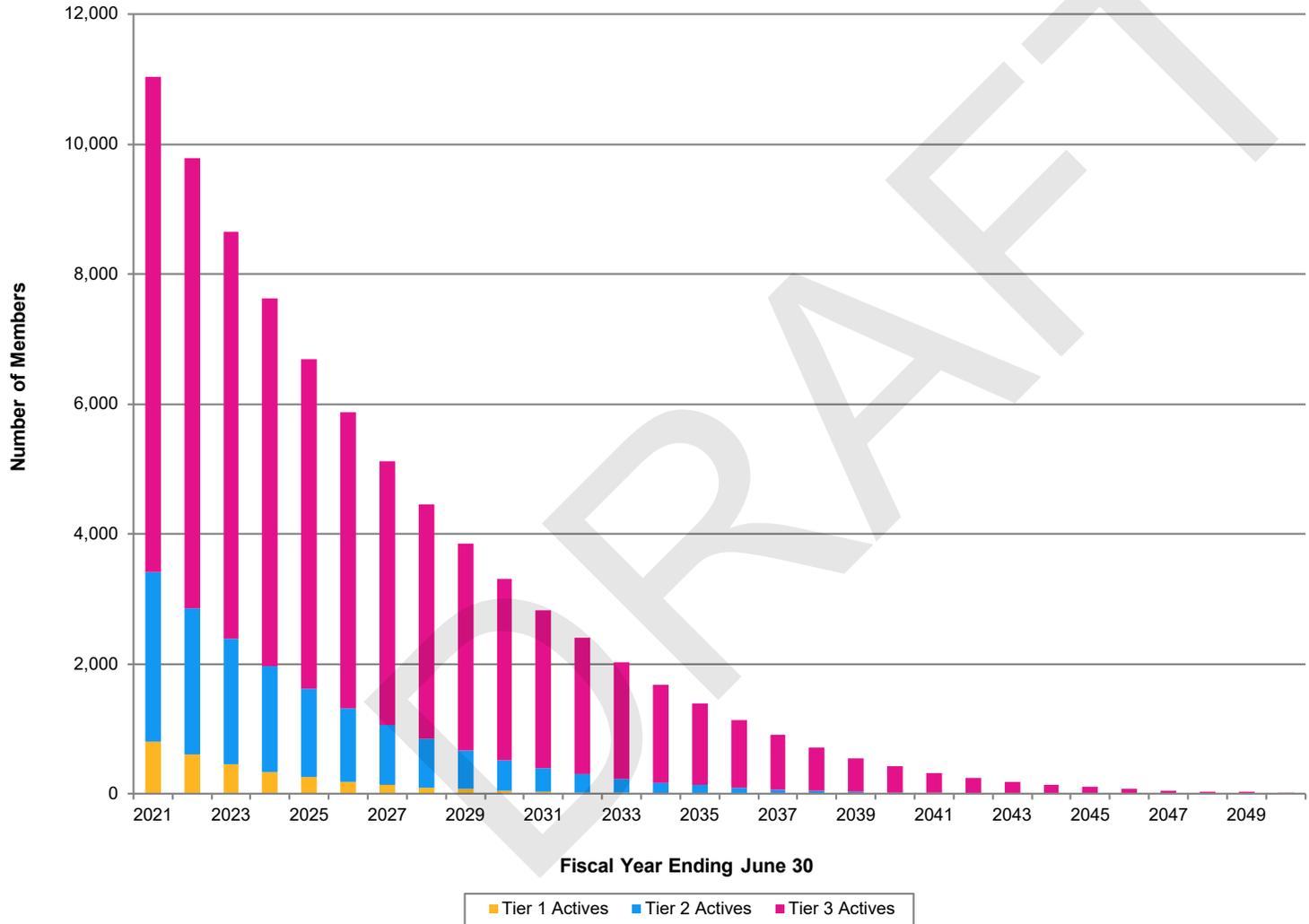
Section 3.1: Projection Assumptions and Methods

Key Assumptions

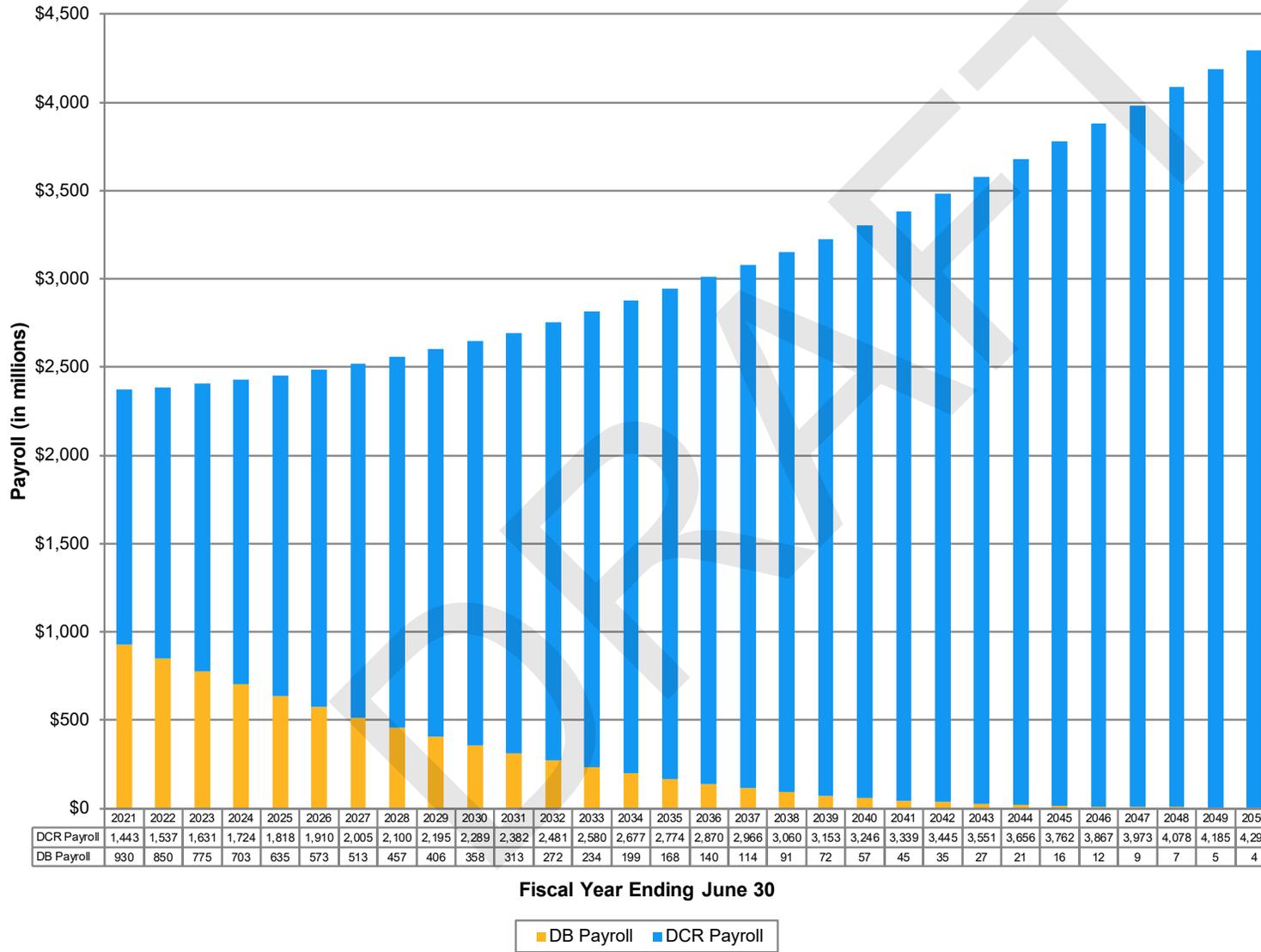
- 7.38% investment return (net of investment expenses) on the Fair Value of Assets in all future years.
- The Actuarial Value of Assets was re-initialized to Fair Value as of June 30, 2014. The Actuarial Value of Assets after June 30, 2014 reflects the deferred gains and losses generated by the smoothing method. The current deferred amount is recognized in the first four years of the projections.
- Actuarial assumptions and methods as described in Section 5. No actuarial gains/losses are assumed after June 30, 2020.
- The actuarially calculated contribution rate using a two-year roll-forward approach is adopted each year.
- Projections assume a 0% increase in the total active member population. All new members are expected to enter the DCR plan.
- Contribution rates are determined as a percent of total DB and DCR payroll.
- The DCR contribution rate determined as of June 30, 2020 is assumed to remain constant in all future years.
- The active rehire assumption shown in Section 5 is assumed to grade to zero on a uniform basis over 20 years.
- The Normal Cost is increased by the administrative expenses shown in Section 5. For future years, the percent increase is assumed to remain constant.

Section 3.2: Membership Projection

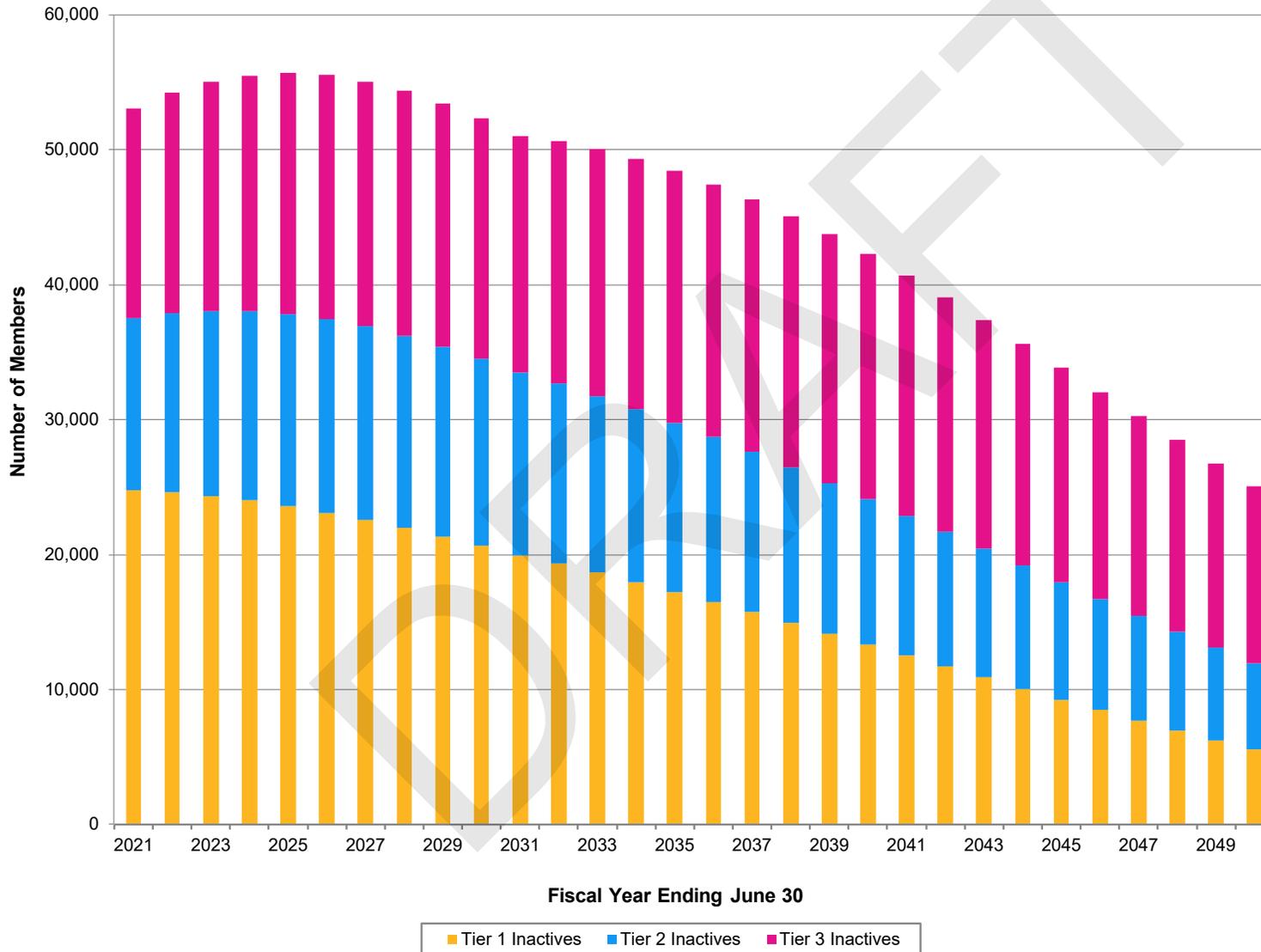
Projected Active Member Count



Projected DB and DCR Payroll

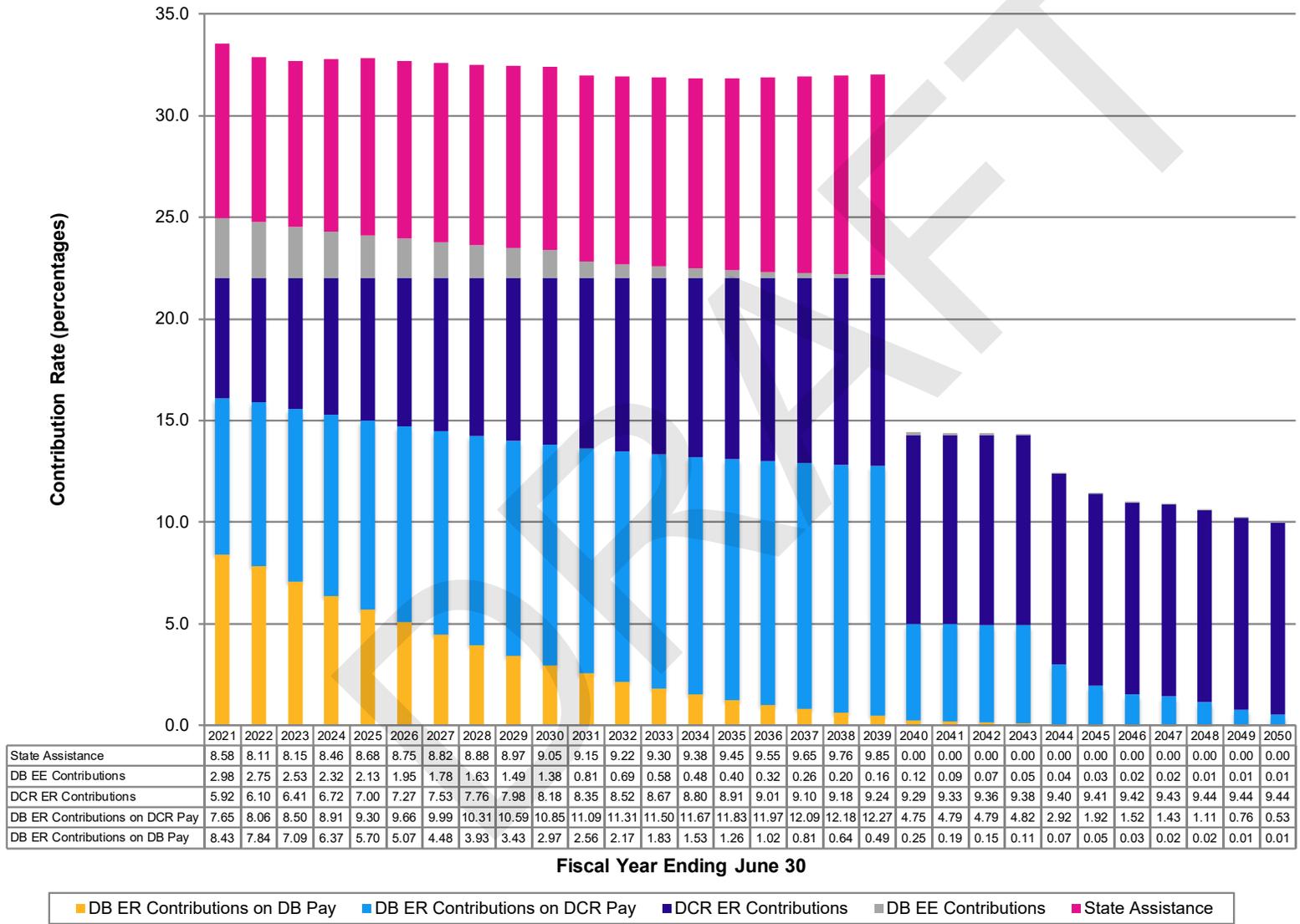


Projected Inactive Member Count

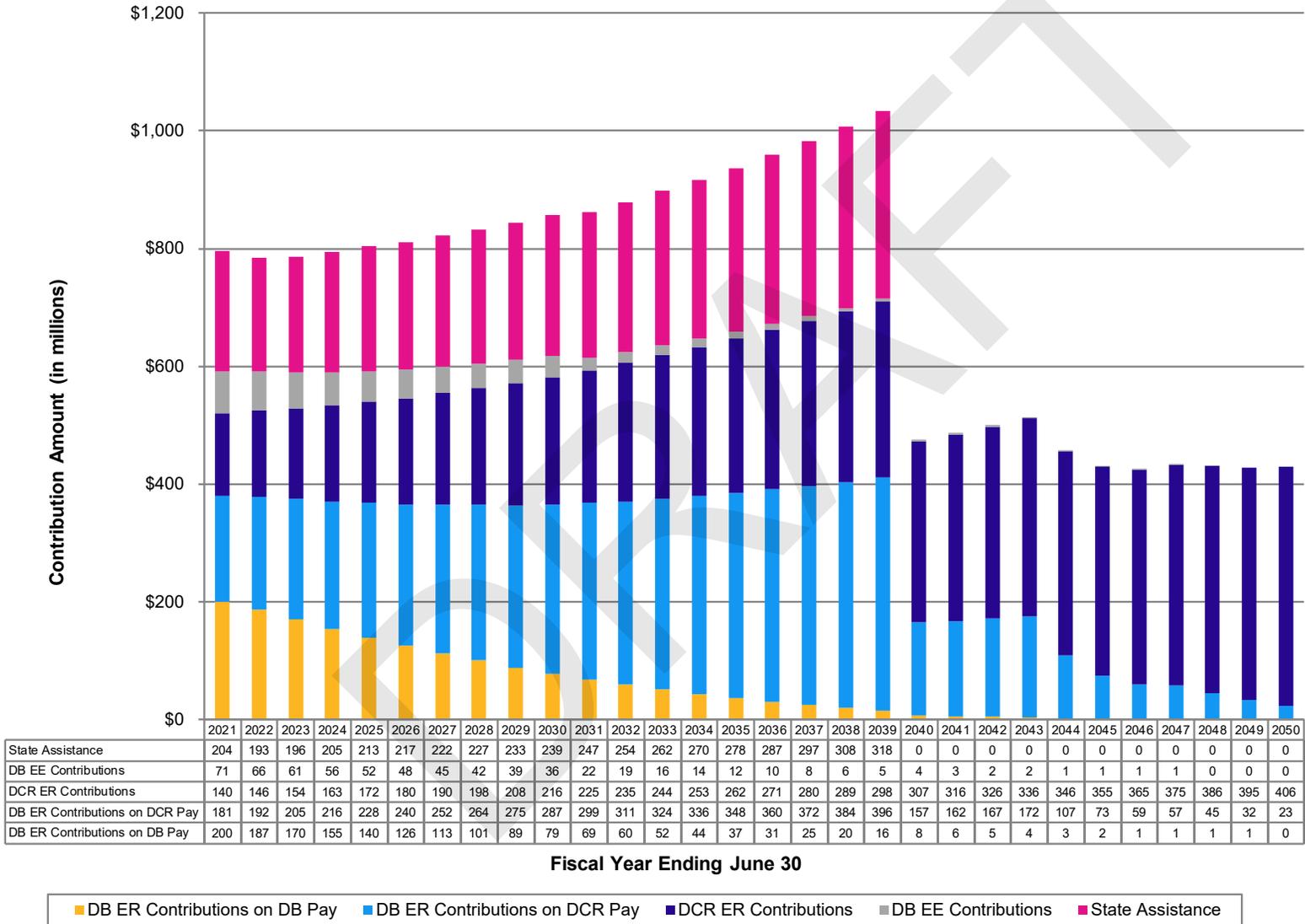


Section 3.3: Projected Employer/State Contribution Rates

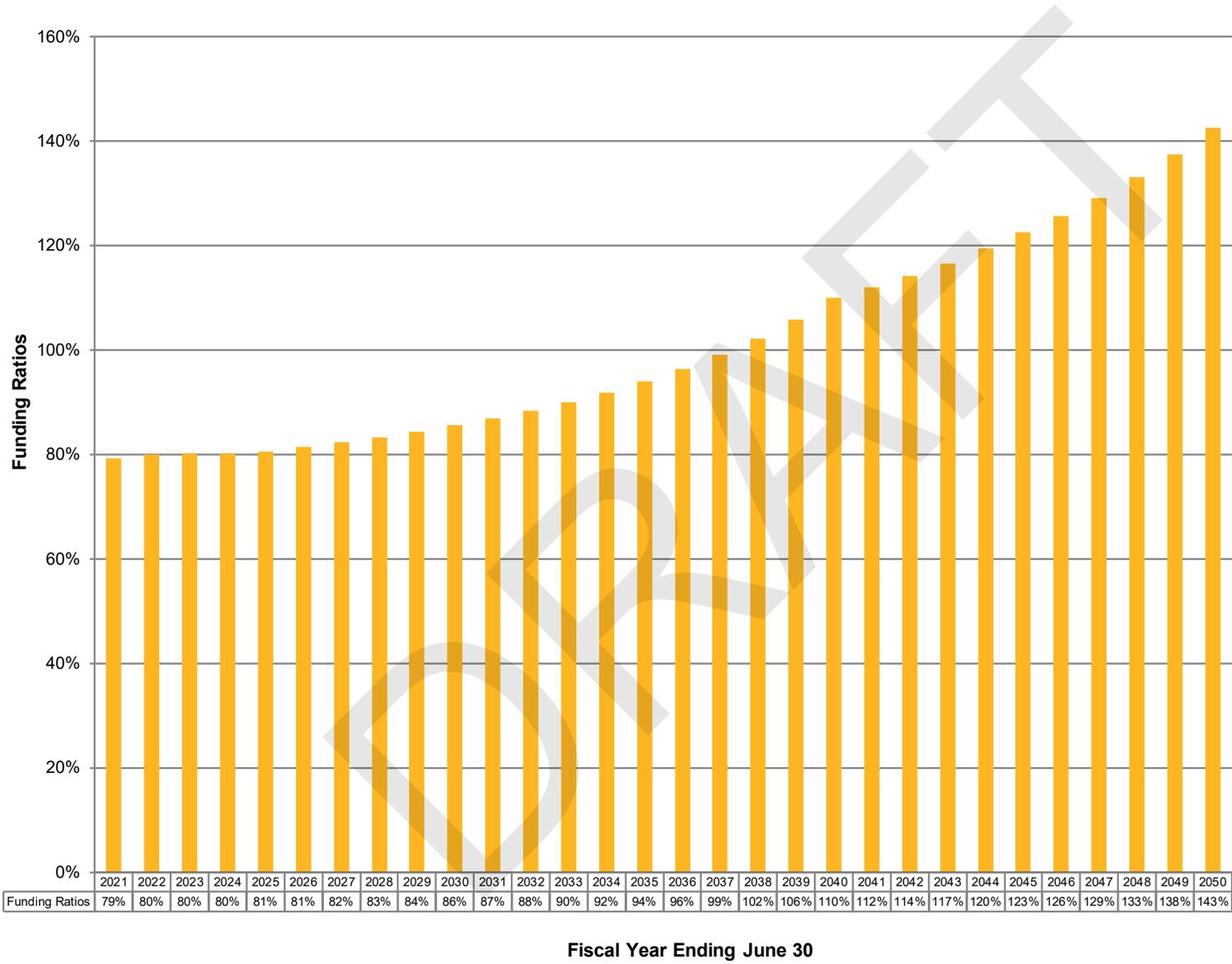
Based on Total DB and DCR Payroll



Section 3.4: Projected Employer/State Contribution Amounts



Section 3.5: Projection of Funded Ratios



Section 3.6: Table of Projected Actuarial Results (\$'s in 000's)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)				Cash Flow Amounts during Following 12 Months								Deferred Asset Gain / (Loss)	
	Actuarial Assets	Accrued Liability	Funding Ratio	Unfunded Liability / (Surplus)	Total Salaries	Contribution Rates			DB Contributions					Benefit Payments
						Employer / State	DCR	Total	Employer	State Assistance	Employee	Total		
2021	\$ 17,703,068	\$ 22,316,075	79.3%	\$ 4,613,007	\$ 2,373,078	24.66%	5.92%	30.58%	\$ 381,591	\$ 203,585	\$ 70,747	\$ 655,923	\$ 1,352,299	\$ (418,528)
2022	18,247,187	22,784,800	80.1%	4,537,613	2,386,626	24.01%	6.10%	30.11%	379,474	193,494	65,590	638,558	1,421,212	(269,705)
2023	18,595,915	23,193,406	80.2%	4,597,491	2,405,076	23.74%	6.41%	30.15%	374,951	196,014	60,746	631,711	1,489,985	(111,116)
2024	18,894,305	23,547,126	80.2%	4,652,821	2,427,345	23.74%	6.72%	30.46%	370,898	205,353	56,410	632,661	1,555,059	0
2025	19,208,705	23,835,914	80.6%	4,627,209	2,453,152	23.68%	7.00%	30.68%	367,973	212,934	52,320	633,227	1,616,352	0
2026	19,603,824	24,064,939	81.5%	4,461,115	2,482,633	23.48%	7.27%	30.75%	365,692	217,230	48,466	631,388	1,673,417	0
2027	19,968,002	24,236,014	82.4%	4,268,012	2,518,456	23.29%	7.53%	30.82%	364,421	222,128	44,877	631,426	1,725,814	0
2028	20,305,701	24,350,613	83.4%	4,044,912	2,557,461	23.12%	7.76%	30.88%	364,183	227,103	41,747	633,033	1,777,534	0
2029	20,617,244	24,407,417	84.5%	3,790,173	2,600,575	22.99%	7.98%	30.97%	364,600	233,272	38,835	636,707	1,825,840	0
2030	20,906,363	24,406,459	85.7%	3,500,096	2,646,356	22.87%	8.18%	31.05%	365,726	239,495	36,390	641,611	1,873,521	0
2031	21,173,270	24,345,754	87.0%	3,172,484	2,695,674	22.80%	8.35%	31.15%	367,960	246,654	21,835	636,449	1,907,575	0
2032	21,420,038	24,222,943	88.4%	2,802,905	2,753,450	22.70%	8.52%	31.22%	371,165	253,868	18,999	644,032	1,950,868	0
2033	21,648,740	24,037,418	90.1%	2,388,678	2,813,927	22.63%	8.67%	31.30%	375,096	261,695	16,321	653,112	1,991,642	0
2034	21,862,183	23,787,589	91.9%	1,925,406	2,876,779	22.58%	8.80%	31.38%	379,735	269,842	13,809	663,386	2,025,140	0
2035	22,067,995	23,477,147	94.0%	1,409,152	2,942,401	22.54%	8.91%	31.45%	385,160	278,057	11,770	674,987	2,054,265	0
2036	22,271,486	23,106,796	96.4%	835,310	3,010,276	22.54%	9.01%	31.55%	391,035	287,481	9,633	688,149	2,078,154	0
2037	22,479,542	22,678,036	99.1%	198,494	3,079,581	22.55%	9.10%	31.65%	397,266	297,180	8,007	702,453	2,097,506	0
2038	22,698,380	22,193,626	102.3%	(504,754)	3,150,757	22.58%	9.18%	31.76%	403,927	307,514	6,302	717,743	2,107,908	0
2039	22,939,090	21,658,492	105.9%	(1,280,598)	3,225,637	22.61%	9.24%	31.85%	411,592	317,725	5,161	734,478	2,112,689	0
2040	23,210,569	21,075,430	110.1%	(2,135,139)	3,303,529	5.00%	9.29%	14.29%	165,177	0	3,964	169,141	2,106,710	0
2041	22,910,733	20,452,598	112.0%	(2,458,135)	3,384,397	4.98%	9.33%	14.31%	168,543	0	3,046	171,589	2,093,286	0
2042	22,605,407	19,795,332	114.2%	(2,810,075)	3,480,660	4.94%	9.36%	14.30%	171,945	0	2,436	174,381	2,070,972	0
2043	22,303,744	19,113,840	116.7%	(3,189,904)	3,578,351	4.93%	9.38%	14.31%	176,413	0	1,789	178,202	2,041,737	0
2044	22,014,246	18,408,000	119.6%	(3,606,246)	3,677,480	2.99%	9.40%	12.39%	109,957	0	1,471	111,428	2,000,543	0
2045	21,677,042	17,691,616	122.5%	(3,985,426)	3,777,877	1.97%	9.41%	11.38%	74,424	0	1,133	75,557	1,953,832	0
2046	21,326,348	16,969,894	125.7%	(4,356,454)	3,879,356	1.55%	9.42%	10.97%	60,130	0	776	60,906	1,900,124	0
2047	20,990,408	16,249,910	129.2%	(4,740,498)	3,981,953	1.45%	9.43%	10.88%	57,738	0	796	58,534	1,839,620	0
2048	20,690,074	15,539,015	133.1%	(5,151,059)	4,084,877	1.13%	9.44%	10.57%	46,159	0	408	46,567	1,776,589	0
2049	20,420,650	14,840,648	137.6%	(5,580,002)	4,189,471	0.77%	9.44%	10.21%	32,259	0	419	32,678	1,710,031	0
2050	20,186,081	14,159,513	142.6%	(6,026,568)	4,295,833	0.54%	9.44%	9.98%	23,198	0	430	23,628	1,643,351	0
Total									\$ 8,268,388	\$ 4,670,624	\$ 644,633	\$ 13,583,645		

The FY21 and FY22 Employer/State contribution rates shown above differ from those shown in Section 1.6 because they are adjusted for total salaries.

Section 3.6: Table of Projected Actuarial Results (\$'s in 000's) (continued)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)					
	Funding Ratio			Unfunded Liability / (Surplus)		
	Pension	Healthcare	Total	Pension	Healthcare	Total
2021	63.6%	113.5%	79.3%	\$ 5,565,815	\$ (952,808)	\$ 4,613,007
2022	64.3%	114.2%	80.1%	5,561,711	(1,024,098)	4,537,613
2023	64.5%	113.8%	80.2%	5,616,279	(1,018,788)	4,597,491
2024	64.6%	113.5%	80.2%	5,670,820	(1,017,999)	4,652,821
2025	65.0%	113.6%	80.6%	5,667,074	(1,039,865)	4,627,209
2026	65.8%	114.4%	81.5%	5,577,327	(1,116,212)	4,461,115
2027	66.6%	115.2%	82.4%	5,466,222	(1,198,210)	4,268,012
2028	67.5%	116.2%	83.4%	5,331,838	(1,286,926)	4,044,912
2029	68.4%	117.2%	84.5%	5,172,138	(1,381,965)	3,790,173
2030	69.5%	118.4%	85.7%	4,984,787	(1,484,691)	3,500,096
2031	70.6%	119.6%	87.0%	4,767,513	(1,595,029)	3,172,484
2032	71.9%	121.1%	88.4%	4,516,939	(1,714,034)	2,802,905
2033	73.4%	122.6%	90.1%	4,230,042	(1,841,364)	2,388,678
2034	75.1%	124.4%	91.9%	3,903,416	(1,978,010)	1,925,406
2035	77.1%	126.3%	94.0%	3,533,951	(2,124,799)	1,409,152
2036	79.4%	128.5%	96.4%	3,117,863	(2,282,553)	835,310
2037	82.1%	131.0%	99.1%	2,651,097	(2,452,603)	198,494
2038	85.2%	133.8%	102.3%	2,129,291	(2,634,045)	(504,754)
2039	88.9%	136.9%	105.9%	1,548,008	(2,828,606)	(1,280,598)
2040	93.4%	140.5%	110.1%	902,171	(3,037,310)	(2,135,139)
2041	93.9%	144.5%	112.0%	803,243	(3,261,378)	(2,458,135)
2042	94.5%	149.1%	114.2%	691,969	(3,502,044)	(2,810,075)
2043	95.3%	154.2%	116.7%	567,737	(3,757,641)	(3,189,904)
2044	96.3%	160.1%	119.6%	428,715	(4,034,961)	(3,606,246)
2045	96.9%	166.7%	122.5%	347,123	(4,332,549)	(3,985,426)
2046	97.2%	174.1%	125.7%	295,695	(4,652,149)	(4,356,454)
2047	97.5%	182.5%	129.2%	254,785	(4,995,283)	(4,740,498)
2048	97.8%	192.0%	133.1%	212,951	(5,364,010)	(5,151,059)
2049	98.1%	202.6%	137.6%	179,738	(5,759,740)	(5,580,002)
2050	98.2%	214.4%	142.6%	158,264	(6,184,832)	(6,026,568)

Section 3.7: Projected Pension Benefit Recipients and Amounts (\$'s in 000's)

Fiscal Year End	Pension		Fiscal Year End	Pension	
	Recipient Counts	Benefit Amounts		Recipient Counts	Benefit Amounts
2021	37,106	\$ 944,242	2063	5,483	\$ 455,513
2022	38,793	992,490	2064	4,863	417,612
2023	40,216	1,040,553	2065	4,301	381,470
2024	41,390	1,085,744	2066	3,791	347,107
2025	42,305	1,128,793	2067	3,331	314,531
2026	42,941	1,168,682	2068	2,917	283,743
2027	43,341	1,207,416	2069	2,545	254,742
2028	43,552	1,244,432	2070	2,210	227,523
2029	43,570	1,278,265	2071	1,912	202,081
2030	43,434	1,310,048	2072	1,644	178,407
2031	43,151	1,326,467	2073	1,408	156,487
2032	42,720	1,351,117	2074	1,198	136,309
2033	42,174	1,372,363	2075	1,014	117,850
2034	41,490	1,389,157	2076	851	101,080
2035	40,692	1,402,114	2077	710	85,960
2036	39,762	1,411,600	2078	588	72,437
2037	38,757	1,416,691	2079	482	60,446
2038	37,645	1,416,338	2080	392	49,913
2039	36,410	1,411,150	2081	316	40,754
2040	35,077	1,399,710	2082	252	32,876
2041	33,649	1,384,091	2083	198	26,184
2042	32,165	1,363,346	2084	154	20,571
2043	30,643	1,337,810	2085	119	15,932
2044	29,064	1,308,254	2086	90	12,154
2045	27,478	1,274,056	2087	68	9,127
2046	25,874	1,236,540	2088	51	6,744
2047	24,279	1,195,888	2089	37	4,901
2048	22,692	1,152,688	2090	27	3,502
2049	21,137	1,107,277	2091	19	2,461
2050	19,623	1,060,091	2092	14	1,702
2051	18,155	1,011,662	2093	9	1,160
2052	16,737	962,432	2094	7	781
2053	15,376	912,768	2095	5	521
2054	14,075	863,028	2096	4	347
2055	12,840	813,551	2097	3	232
2056	11,672	764,642	2098	2	157
2057	10,575	716,562	2099	2	109
2058	9,551	669,535	2100	1	78
2059	8,599	623,742	2101	1	57
2060	7,718	579,336	2102	1	44
2061	6,907	536,436	2103	1	34
2062	6,162	495,138	2104	0	0

Counts include retirees, disabilitants, and beneficiaries.

Section 4: Member Data

Section 4.1: Summary of Members Included

As of June 30	2016	2017	2018	2019	2020
Active Members					
1. Number	16,105	14,719	13,434	12,152	11,033 ¹
2. Average Age	51.74	52.10	52.52	52.84	53.21
3. Average Credited Service	15.95	16.57	17.21	17.80	18.38
4. Average Entry Age	35.79	35.53	35.30	35.04	34.83
5. Average Annual Earnings	\$ 75,717	\$ 76,902	\$ 77,813	\$ 82,192	\$ 83,757
6. Number Vested	15,607	14,314	13,103	11,868	10,791
7. Percent Who Are Vested	96.9%	97.2%	97.5%	97.7%	97.8%
Retirees, Disabilitants, and Beneficiaries					
1. Number	33,353	34,347	35,454	36,310	37,106
2. Average Age	69.02	69.42	69.85	70.29	70.77
3. Average Years Since Retirement	11.48	11.71	11.87	12.14	12.45
4. Average Monthly Pension Benefit					
a. Base	\$ 1,529	\$ 1,574	\$ 1,616	\$ 1,660	\$ 1,704
b. COLA ²	93	93	94	92	93
c. PRPA ²	245	230	222	241	244
d. Adjustment	1	1	1	1	0
e. Total	\$ 1,868	\$ 1,898	\$ 1,933	\$ 1,994	\$ 2,041
Vested Terminations (vested at termination, not refunded contributions, or commenced benefit)					
1. Number	6,160	5,962	5,660	5,499	5,327
2. Average Age	52.08	52.45	52.56	53.06	53.52
3. Average Monthly Pension Benefit	\$ 1,042	\$ 1,080	\$ 1,087	\$ 1,123	\$ 1,158
Non-Vested Terminations (not vested at termination, not refunded contributions)					
1. Number	11,880	11,506	11,192	10,921	10,642
2. Average Account Balance	\$ 6,212	\$ 6,462	\$ 6,558	\$ 6,923	\$ 7,060
Total Number of Members	67,498	66,534	65,740	64,882	64,108

¹ Includes 5,143 male active members and 5,890 female active members.

² Calculated by taking the average of the data field, as provided by the State of Alaska, for all participants in the group.

Summary of Members Included

As of June 30, 2020	DB				DCR Tier 4	Grand Total
	Tier 1	Tier 2	Tier 3	Total		
Active Members						
1. Number	811	2,604	7,618	11,033	22,923	33,956
2. Average Age	62.60	56.29	51.16	53.21	41.21	45.11
3. Average Credited Service	23.14	22.92	16.32	18.38	4.66	9.12
4. Average Entry Age	39.46	33.37	34.84	34.83	36.55	35.99
5. Annual Earnings						
a. Total (000's)	\$ 63,777	\$ 229,189	\$ 631,121	\$ 924,087	\$ 1,428,140	\$ 2,352,227
b. Average	\$ 78,640	\$ 88,014	\$ 82,846	\$ 83,757	\$ 62,302	\$ 69,273

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

As of June 30, 2020	Tier 1	Tier 2	Tier 3	Total
Retirees, Disabilitants, and Beneficiaries				
1. Number	23,447	8,891	4,768	37,106
2. Average Age	72.24	68.79	67.18	70.77
3. Average Years Since Retirement	15.45	8.31	5.31	12.45
4. Average Monthly Pension Benefit				
a. Base	\$ 1,739	\$ 1,823	\$ 1,312	\$ 1,704
b. COLA	118	55	42	93
c. PRPA	336	107	48	244
d. Adjustment	0	1	2	0
e. Total	\$ 2,193	\$ 1,986	\$ 1,404	\$ 2,041

Summary of Members Included

As of June 30, 2020	Inactive Members					Total Inactive Members
	Active Members	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	
Retiree Medical Participants						
1. Retiree Coverage Only	10,908	19,141	0	0	2,200	21,341
2. Retiree + Spouse	0	12,543	12,543	0	3,391	28,477
3. Retiree + Children / Dependents	0	393	0	402	0	795
4. Family	0	780	780	1,091	0	2,651
5. Total	10,908	32,857	13,323	1,493	5,591	53,264

As of June 30, 2020	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
Retiree Medical Participants					
1. Pre-Medicare	7,797	4,937	1,493	5,426	19,653
2. Medicare Part A & B	24,860	8,345	0	165	33,370
3. Medicare Part B Only	200	41	0	0	241
4. Total	32,857	13,323	1,493	5,591	53,264

As of June 30, 2020	Retirees
Summary of Retiree Medical Data Received	
1. Retiree records on pension data	37,106
2. Remove duplicates on pension data	(1,125)
3. Valued in a different retiree healthcare plan ¹	(1,150)
4. Records without medical coverage	(2,199)
5. Medical only retirees	225
6. Total	32,857

¹ Each member's retiree medical benefits are valued in the plan indicated in the data from Aetna

Summary of Members Included

Active Members – DB Only

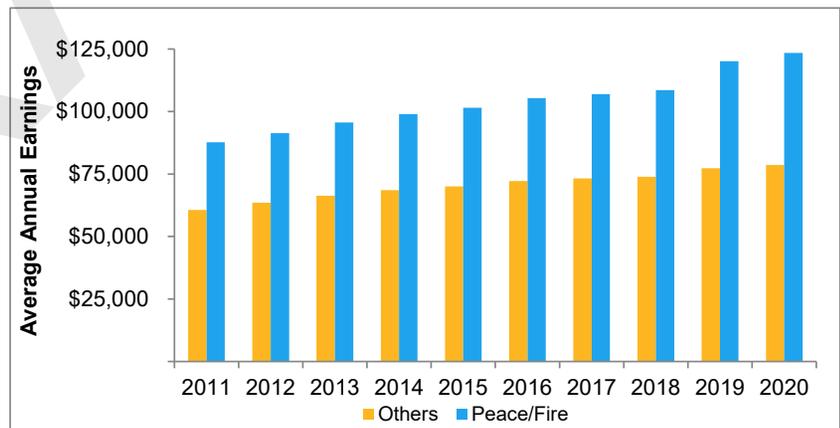
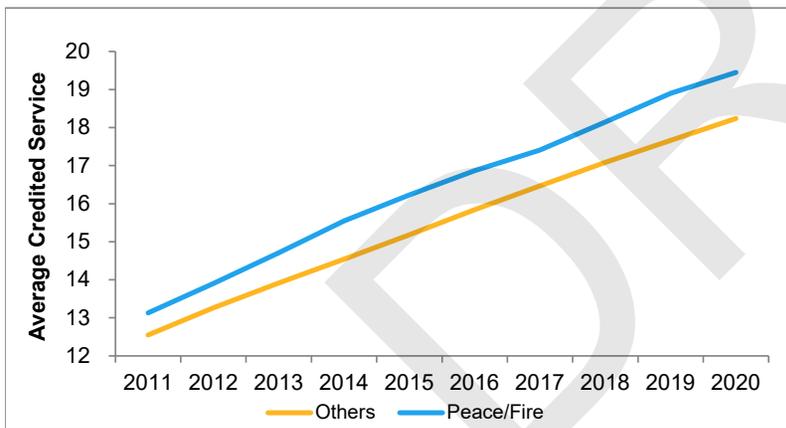
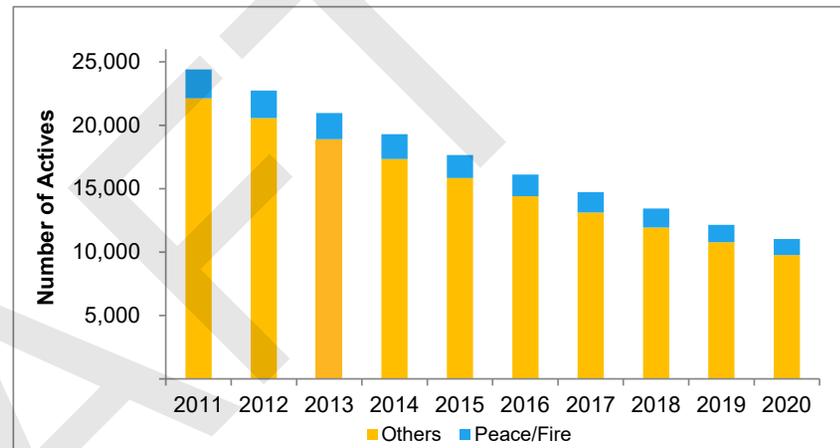
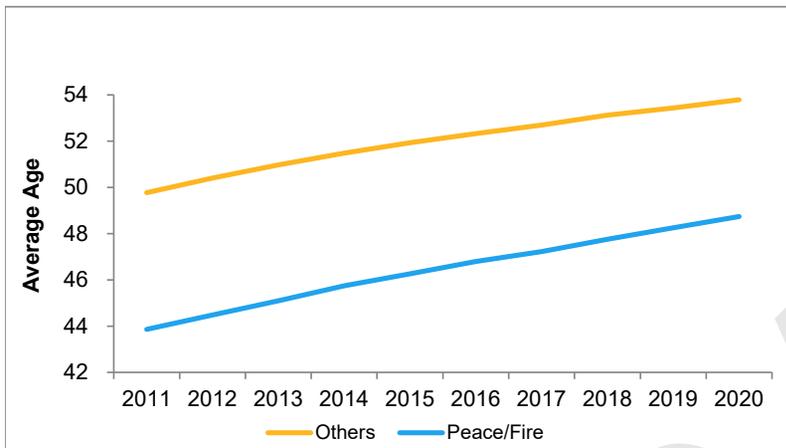
As of June 30	2016	2017	2018	2019	2020
Peace Officer / Firefighter					
1. Number	1,704	1,606	1,507	1,382	1,266 ¹
2. Average Age	46.80	47.22	47.75	48.25	48.74
3. Average Credited Service	16.87	17.41	18.15	18.90	19.45
4. Average Entry Age	29.93	29.81	29.60	29.35	29.29
5. Average Annual Earnings	\$ 105,317	\$ 106,987	\$ 108,580	\$ 120,089	\$ 123,436
6. Number Vested	1,695	1,599	1,500	1,374	1,260
7. Percent Who Are Vested	99.5%	99.6%	99.5%	99.4%	99.5%
Others					
1. Number	14,401	13,113	11,927	10,770	9,767 ²
2. Average Age	52.32	52.70	53.12	53.43	53.79
3. Average Credited Service	15.84	16.47	17.09	17.66	18.24
4. Average Entry Age	36.48	36.23	36.03	35.77	35.55
5. Average Annual Earnings	\$ 72,214	\$ 73,218	\$ 73,926	\$ 77,329	\$ 78,613
6. Number Vested	13,912	12,715	11,603	10,494	9,531
7. Percent Who Are Vested	96.6%	97.0%	97.3%	97.4%	97.6%
Total					
1. Number	16,105	14,719	13,434	12,152	11,033
2. Average Age	51.74	52.10	52.52	52.84	53.21
3. Average Credited Service	15.95	16.57	17.21	17.80	18.38
4. Average Entry Age	35.79	35.53	35.30	35.04	34.83
5. Average Annual Earnings	\$ 75,717	\$ 76,902	\$ 77,813	\$ 82,192	\$ 83,757
6. Number Vested	15,607	14,314	13,103	11,868	10,791
7. Percent Who Are Vested	96.9%	97.2%	97.5%	97.7%	97.8%

Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

¹ Includes 1,079 male active members and 187 female active members.

² Includes 4,064 male active members and 5,703 female active members.

Summary of Members Included - Active Members at June 30



Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 4.2: Age and Service Distribution of Active Members

Peace Officer / Firefighter

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	4	408,811	102,203
35 - 39	114	13,859,704	121,576
40 - 44	262	33,452,322	127,681
45 - 49	370	46,256,845	125,019
50 - 54	304	38,084,025	125,276
55 - 59	156	18,254,063	117,013
60 - 64	39	4,287,148	109,927
65 - 69	14	1,372,890	98,064
70 - 74	3	294,708	98,236
75+	0	0	0
Total	1,266	\$156,270,516	\$ 123,436

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	0	\$ 0	\$ 0
1	2	111,157	55,579
2	0	0	0
3	1	66,184	66,184
4	2	213,466	106,733
0 - 4	5	\$ 390,807	\$ 78,161
5 - 9	16	1,302,626	81,414
10 - 14	201	22,407,573	111,480
15 - 19	521	62,103,286	119,200
20 - 24	361	48,056,326	133,120
25 - 29	134	18,486,683	137,960
30 - 34	25	3,096,577	123,863
35 - 39	2	320,210	160,105
40+	1	106,428	106,428
Total	1,266	\$156,270,516	\$ 123,436

Years of Credited Service by Age

Age	Years of Service										Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+		
0 - 19	0	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0	0
30 - 34	0	1	2	1	0	0	0	0	0	0	4
35 - 39	0	3	58	53	0	0	0	0	0	0	114
40 - 44	2	3	51	146	59	1	0	0	0	0	262
45 - 49	1	2	36	139	152	40	0	0	0	0	370
50 - 54	1	2	28	88	108	68	9	0	0	0	304
55 - 59	1	3	20	74	31	18	8	1	0	0	156
60 - 64	0	0	4	17	8	3	6	1	0	0	39
65 - 69	0	2	2	2	3	4	1	0	0	0	14
70 - 74	0	0	0	1	0	0	1	0	1	1	3
75+	0	0	0	0	0	0	0	0	0	0	0
Total	5	16	201	521	361	134	25	2	1	1,266	

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Age and Service Distribution of Active Members

Others

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	46	3,247,979	70,608
35 - 39	516	40,040,027	77,597
40 - 44	1,062	84,407,079	79,479
45 - 49	1,506	125,306,747	83,205
50 - 54	1,959	157,426,011	80,360
55 - 59	2,481	192,669,217	77,658
60 - 64	1,446	109,088,955	75,442
65 - 69	562	41,899,213	74,554
70 - 74	153	11,351,675	74,194
75+	36	2,379,772	66,105

Total 9,767 \$767,816,675 \$ 78,613

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	14	\$ 694,247	\$ 49,589
1	44	2,150,347	48,872
2	53	2,587,818	48,827
3	47	2,503,068	53,257
4	48	2,576,050	53,668
0 - 4	206	\$ 10,511,530	\$ 51,027
5 - 9	591	35,081,327	59,359
10 - 14	2,158	148,468,664	68,799
15 - 19	3,432	271,911,618	79,228
20 - 24	1,960	170,400,897	86,939
25 - 29	1,015	93,089,472	91,714
30 - 34	307	29,230,726	95,214
35 - 39	77	7,294,237	94,730
40+	21	1,828,204	87,057

Total 9,767 \$767,816,675 \$ 78,613

Years of Credited Service by Age

Age	Years of Service										Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+		
0 - 19	0	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0	0
30 - 34	2	21	22	1	0	0	0	0	0	0	46
35 - 39	39	60	259	153	5	0	0	0	0	0	516
40 - 44	33	94	314	525	96	0	0	0	0	0	1,062
45 - 49	32	101	331	618	365	59	0	0	0	0	1,506
50 - 54	40	110	392	644	473	252	47	1	0	0	1,959
55 - 59	32	95	450	794	561	418	119	12	0	0	2,481
60 - 64	17	71	257	487	311	184	86	31	2	2	1,446
65 - 69	10	24	106	159	118	84	38	16	7	7	562
70 - 74	1	13	23	38	24	17	13	15	9	9	153
75+	0	2	4	13	7	1	4	2	3	3	36
Total	206	591	2,158	3,432	1,960	1,015	307	77	21	21	9,767

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 4.3: Member Data Reconciliation

Pension

	Inactive Members						Total
	Active Members	Due a Refund	Deferred Benefits	Retired Members	Disabled Members	Bene-ficiaries	
As of June 30, 2019	12,152	10,887	5,499	31,922 *	173	4,231	64,864
Vested Terminations	(427)	0	427	0	0	0	0
Non-Vested Terminations	(45)	45	0	0	0	0	0
Refund of Contributions	(12)	(203)	(44)	(1)	0	0	(260)
Disability Retirements	(7)	0	(5)	0	12	0	0
Age Retirements	(862)	(19)	(399)	1,309	(29)	0	0
Deaths With Beneficiary	(12)	(10)	(15)	(260)	(4)	301	0
Deaths Without Beneficiary	(6)	(16)	(5)	(419)	(2)	(118)	(566)
Expired Benefits	0	0	0	0	0	0	0
Data Corrections	(1)	(3)	1	2	0	(11)	(12)
Converted To DCR Plan	0	0	0	0	0	0	0
Transfers In/Out	6	(1)	(5)	0	0	0	0
Rehires	246	(86)	(139)	(19)	(1)	0	1
Pick Ups***	1	48	12	2	0	33	96
Net Change	(1,119)	(245)	(172)	614	(24)	205	(741)
As of June 30, 2020	11,033	10,642	5,327	32,536 **	149	4,436	64,123

* Includes 16 medical only retirees

** Includes 15 medical only retirees

*** Pickup beneficiaries are primarily new DROs.

Member Data Reconciliation

Healthcare

	Active Members	Inactive Members				Total Inactive Members
		Retirees	Covered Spouses	Covered Children / Dependents	Deferred	
As of June 30, 2019	12,019	32,290	13,131	1,565	5,781	52,767
Vested Terminations	(396)	0	0	0	396	396
Non-Vested Terminations	(45)	0	0	0	0	0
Refund of Contributions	(13)	(1)	0	0	(120)	(121)
Disability Retirements	(7)	7	4	1	0	12
Age Retirements	(800)	800	425	122	0	1,347
Deferred Retirements	0	286	141	28	(286)	169
Retired without Medical Coverage	(69)	0	0	0	23	23
Deceased	(18)	(742)	(49)	(11)	(39)	(841)
New Beneficiaries	0	144	(144)	0	0	0
Added Retiree Medical Coverage	0	113	40	7	0	160
Added Dependent Coverage	0	0	110	74	0	184
Dropped Retiree Medical Coverage	0	(33)	(10)	(7)	0	(50)
Dropped Dependent Coverage	0	0	(327)	(287)	0	(614)
Rehires	236	(14)	(7)	(4)	(137)	(162)
Transfers In/Out	1	7	9	5	(27)	(6)
Net Change	(1,111)	567	192	(72)	(190)	497
As of June 30, 2020	10,908	32,857	13,323	1,493	5,591	53,264

Section 4.4: Schedule of Active Member Data

Peace Officer / Firefighter

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2020	1,266	\$ 156,271	\$ 123,436	2.8%	153
June 30, 2019	1,382	165,963	120,089	10.6%	155
June 30, 2018	1,507	163,630	108,580	1.5%	155
June 30, 2017	1,606	171,821	106,987	1.6%	155
June 30, 2016	1,704	179,461	105,317	3.8%	155
June 30, 2015	1,827	185,350	101,450	2.5%	159
June 30, 2014	1,958	193,737	98,946	3.4%	159
June 30, 2013	2,065	197,534	95,658	4.8%	159
June 30, 2012	2,164	197,544	91,287	4.1%	160
June 30, 2011	2,275	199,537	87,709	8.6%	160

Others

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2020	9,767	\$ 767,817	\$ 78,613	1.7%	153
June 30, 2019	10,770	832,832	77,329	4.6%	155
June 30, 2018	11,927	881,716	73,926	1.0%	155
June 30, 2017	13,113	960,106	73,218	1.4%	155
June 30, 2016	14,401	1,039,960	72,214	3.2%	155
June 30, 2015	15,833	1,108,218	69,994	2.1%	159
June 30, 2014	17,339	1,188,918	68,569	3.4%	159
June 30, 2013	18,890	1,252,786	66,320	4.5%	159
June 30, 2012	20,566	1,305,337	63,471	4.6%	160
June 30, 2011	22,118	1,342,122	60,680	4.7%	160

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 4.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY20 in employer list	\$ 2,198,657
b) DRB actual reported salaries FY20 in valuation data	2,172,811
c) Annualized valuation data	2,352,227
d) Valuation payroll as of June 30, 2020	2,451,532
e) Rate payroll for FY21	2,373,078
f) Rate payroll for FY23	2,405,076

- a) Actual reported salaries from DRB employer listing showing all payroll paid during FY20, including those who were not active as of June 30, 2020
- b) Payroll from valuation data for people who are in active status as of June 30, 2020
- c) Payroll from (b) annualized for both new entrants and part-timers
- d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
- e) Payroll from (d) with the part-timer annualization removed
- f) Payroll from (e) with two years of assumed decrements and salary scale, and 0% population growth

Section 4.6: Summary of New Pension Benefit Recipients

Peace Officer / Firefighter

During the Year Ending June 30	2016	2017	2018	2019	2020
Service					
1. Number	108	119	105	109	118
2. Average Age at Commencement	55.91	56.65	55.70	55.61	55.52
3. Average Monthly Pension Benefit	\$ 4,614	\$ 4,166	\$ 4,519	\$ 4,412	\$ 5,199
Survivor (including surviving spouse and DROs)					
1. Number	27	42	44	36	43
2. Average Age at Commencement	61.48	62.88	63.76	68.19	67.92
3. Average Monthly Pension Benefit	\$ 1,745	\$ 1,797	\$ 2,187	\$ 1,842	\$ 1,785
Disability					
1. Number	2	4	4	4	3
2. Average Age at Commencement	42.07	49.33	46.56	50.44	51.72
3. Average Monthly Pension Benefit	\$ 3,096	\$ 2,427	\$ 3,230	\$ 3,071	\$ 5,276
Total					
1. Number	137	165	153	149	164
2. Average Age at Commencement	56.81	58.06	57.78	58.51	58.70
3. Average Monthly Pension Benefit	\$ 4,026	\$ 3,521	\$ 3,814	\$ 3,755	\$ 4,305

Summary of New Pension Benefit Recipients

Peace Officer / Firefighter

	Years of Credited Service						
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+
Period 7/1/2019 – 6/30/2020:							
Average Monthly Pension	\$ 0	\$ 694	\$ 2,212	\$ 3,626	\$ 5,531	\$ 6,829	\$ 8,636
Number of Recipients	0	6	11	23	40	32	9
Period 7/1/2018 – 6/30/2019:							
Average Monthly Pension	\$ 0	\$ 651	\$ 1,933	\$ 3,362	\$ 4,786	\$ 6,196	\$ 5,688
Number of Recipients	0	5	11	25	38	26	6
Period 7/1/2017 – 6/30/2018:							
Average Monthly Pension	\$ 0	\$ 1,063	\$ 2,133	\$ 3,747	\$ 4,847	\$ 6,024	\$ 7,717
Number of Recipients	0	4	18	19	35	30	3
Period 7/1/2016 – 6/30/2017:							
Average Monthly Pension	\$ 0	\$ 686	\$ 2,075	\$ 3,234	\$ 4,462	\$ 5,151	\$ 6,376
Number of Recipients	0	8	9	28	41	23	14
Period 7/1/2015 – 6/30/2016:							
Average Monthly Pension	\$ 0	\$ 958	\$ 1,742	\$ 3,347	\$ 4,622	\$ 5,778	\$ 7,221
Number of Recipients	0	6	11	19	30	28	16
Period 7/1/2014 – 6/30/2015:							
Average Monthly Pension	\$ 0	\$ 1,173	\$ 1,621	\$ 3,632	\$ 4,436	\$ 5,457	\$ 6,863
Number of Recipients	0	8	9	26	24	25	7
Period 7/1/2013 – 6/30/2014:							
Average Monthly Pension	\$ 290	\$ 1,423	\$ 2,002	\$ 2,902	\$ 4,014	\$ 5,464	\$ 6,299
Number of Recipients	1	9	10	14	22	16	7
Period 7/1/2012 – 6/30/2013:							
Average Monthly Pension	\$ 0	\$ 865	\$ 1,779	\$ 2,762	\$ 3,793	\$ 4,983	\$ 4,911
Number of Recipients	0	9	8	19	31	18	4
Period 7/1/2011 – 6/30/2012:							
Average Monthly Pension	\$ 0	\$ 1,159	\$ 1,161	\$ 3,142	\$ 3,504	\$ 4,673	\$ 5,079
Number of Recipients	0	13	13	12	20	17	7
Period 7/1/2010 – 6/30/2011:							
Average Monthly Pension	\$ 525	\$ 880	\$ 1,469	\$ 2,666	\$ 3,743	\$ 4,806	\$ 5,661
Number of Recipients	1	8	18	10	24	16	8

"Average Monthly Pension" includes postretirement pension adjustments and cost-of-living increases.

Beneficiaries are not included in the table above.

Summary of New Pension Benefit Recipients

Others

During the Year Ending June 30	2016	2017	2018	2019	2020
Service					
1. Number	1,472	1,393	1,419	1,288	1,166
2. Average Age at Commencement	61.28	61.40	62.19	61.38	61.70
3. Average Monthly Pension Benefit	\$ 2,269	\$ 2,404	\$ 2,477	\$ 2,540	\$ 2,701
Survivor (including surviving spouse and DROs)					
1. Number	286	292	261	238	297
2. Average Age at Commencement	66.30	67.12	70.38	69.25	72.09
3. Average Monthly Pension Benefit	\$ 1,093	\$ 1,150	\$ 1,120	\$ 1,249	\$ 1,204
Disability					
1. Number	22	14	28	17	9
2. Average Age at Commencement	53.04	52.43	53.80	52.95	54.21
3. Average Monthly Pension Benefit	\$ 2,209	\$ 2,405	\$ 1,896	\$ 2,313	\$ 2,422
Total					
1. Number	1,780	1,699	1,708	1,543	1,472
2. Average Age at Commencement	61.98	62.31	63.31	62.50	63.75
3. Average Monthly Pension Benefit	\$ 2,079	\$ 2,189	\$ 2,260	\$ 2,339	\$ 2,397

Summary of New Pension Benefit Recipients

Others

	Years of Credited Service						
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+
Period 7/1/2019 – 6/30/2020:							
Average Monthly Pension	\$ 492	\$ 601	\$ 1,311	\$ 2,065	\$ 3,040	\$ 4,686	\$ 6,213
Number of Recipients	32	165	218	258	183	197	122
Period 7/1/2018 – 6/30/2019:							
Average Monthly Pension	\$ 652	\$ 646	\$ 1,301	\$ 2,071	\$ 3,058	\$ 4,596	\$ 5,685
Number of Recipients	21	190	266	289	222	205	105
Period 7/1/2017 – 6/30/2018:							
Average Monthly Pension	\$ 414	\$ 607	\$ 1,299	\$ 1,982	\$ 3,034	\$ 4,475	\$ 6,085
Number of Recipients	26	221	351	280	223	214	127
Period 7/1/2016 – 6/30/2017:							
Average Monthly Pension	\$ 381	\$ 640	\$ 1,271	\$ 2,067	\$ 3,119	\$ 4,579	\$ 6,224
Number of Recipients	27	254	375	233	212	191	115
Period 7/1/2015 – 6/30/2016:							
Average Monthly Pension	\$ 434	\$ 660	\$ 1,240	\$ 2,017	\$ 3,059	\$ 4,158	\$ 6,583
Number of Recipients	30	323	387	266	192	161	135
Period 7/1/2014 – 6/30/2015:							
Average Monthly Pension	\$ 430	\$ 685	\$ 1,260	\$ 2,008	\$ 3,086	\$ 4,544	\$ 6,195
Number of Recipients	42	284	304	213	198	169	98
Period 7/1/2013 – 6/30/2014:							
Average Monthly Pension	\$ 503	\$ 700	\$ 1,189	\$ 2,065	\$ 3,021	\$ 4,439	\$ 5,490
Number of Recipients	48	347	319	241	214	224	121
Period 7/1/2012 – 6/30/2013:							
Average Monthly Pension	\$ 414	\$ 650	\$ 1,179	\$ 1,925	\$ 2,879	\$ 4,356	\$ 5,208
Number of Recipients	59	349	365	257	206	209	132
Period 7/1/2011 – 6/30/2012:							
Average Monthly Pension	\$ 407	\$ 610	\$ 1,147	\$ 1,931	\$ 2,805	\$ 4,214	\$ 5,076
Number of Recipients	67	351	314	204	208	188	106
Period 7/1/2010 – 6/30/2011:							
Average Monthly Pension	\$ 409	\$ 633	\$ 1,150	\$ 1,876	\$ 2,690	\$ 4,294	\$ 5,226
Number of Recipients	73	352	270	227	172	205	105

"Average Monthly Pension" includes postretirement pension adjustments and cost-of-living increases.

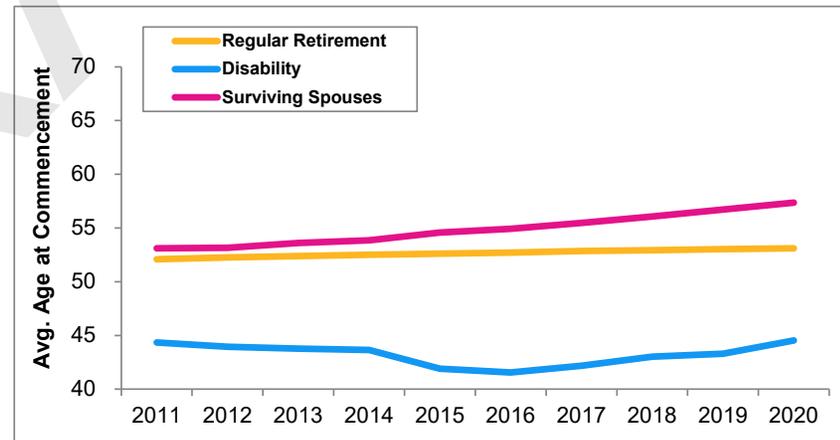
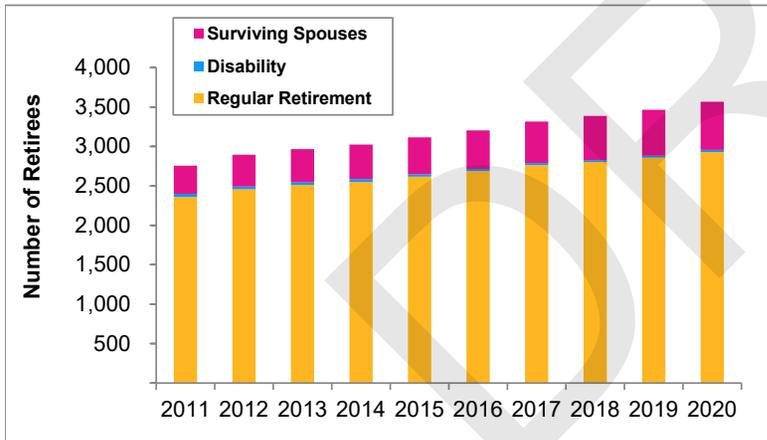
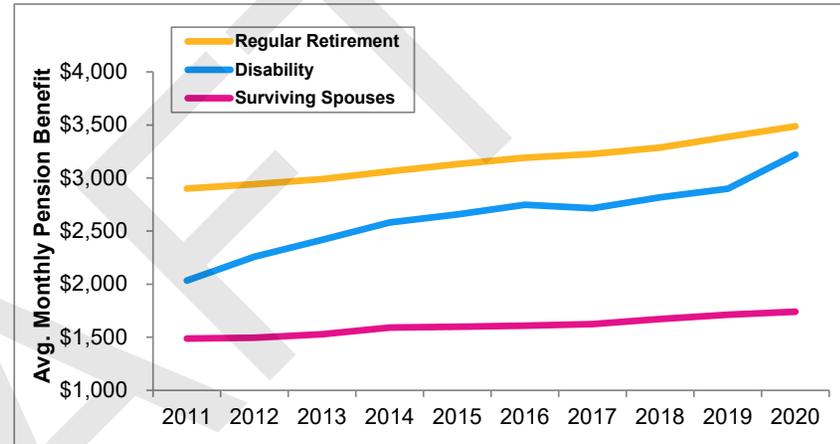
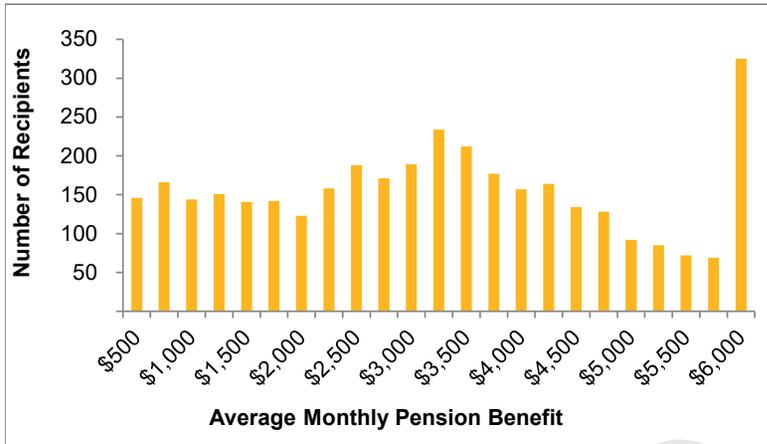
Beneficiaries are not included in the table above.

Section 4.7: Summary of All Pension Benefit Recipients

	Peace Officer / Firefighter	Others
Service		
1. Number as of June 30, 2019	2,857	29,049
2. Net Change During FY20	74	541
3. Number as of June 30, 2020	2,931	29,590
4. Average Age at Commencement	53.11	58.32
5. Average Current Age	68.27	70.81
6. Average Monthly Pension Benefit	\$ 3,487	\$ 2,025
Survivors (including surviving spouses and DROs)		
1. Number as of June 30, 2019	582	3,649
2. Net Change During FY20	29	176
3. Number as of June 30, 2020	611	3,825
4. Average Age at Commencement	57.36	63.08
5. Average Current Age	68.86	73.26
6. Average Monthly Pension Benefit	\$ 1,741	\$ 1,099
Disability		
1. Number as of June 30, 2019	26	147
2. Net Change During FY20	0	(24)
3. Number as of June 30, 2020	26	123
4. Average Age at Commencement	44.53	46.19
5. Average Current Age	49.79	55.00
6. Average Monthly Pension Benefit	\$ 3,222	\$ 1,903
Total		
1. Number as of June 30, 2019	3,465	32,845
2. Net Change During FY20	103	693
3. Number as of June 30, 2020	3,568	33,538
4. Average Age at Commencement	53.78	58.81
5. Average Current Age	68.24	71.04
6. Average Monthly Pension Benefit	\$ 3,186	\$ 1,919

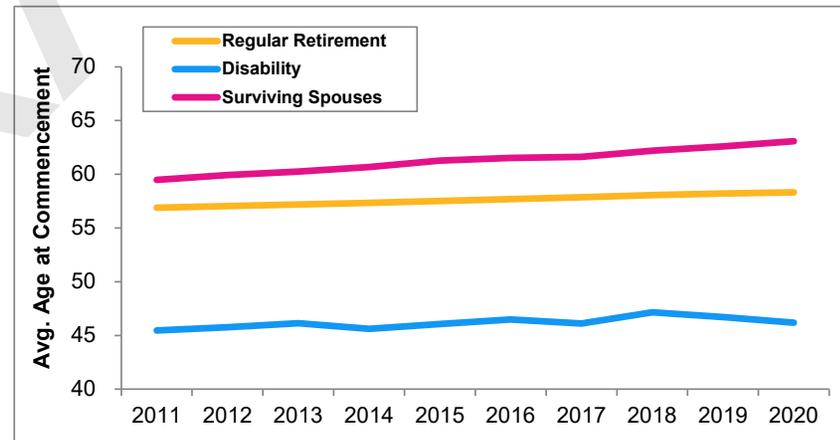
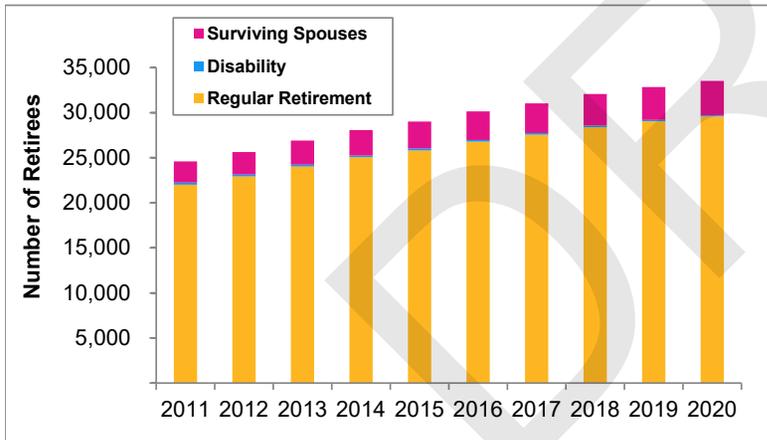
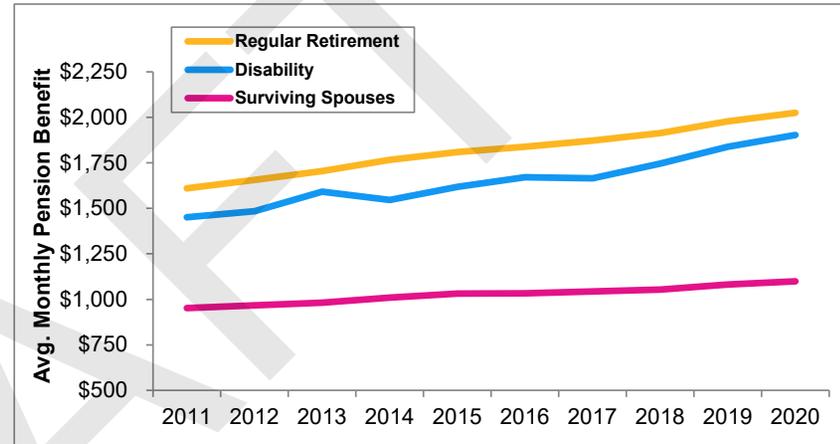
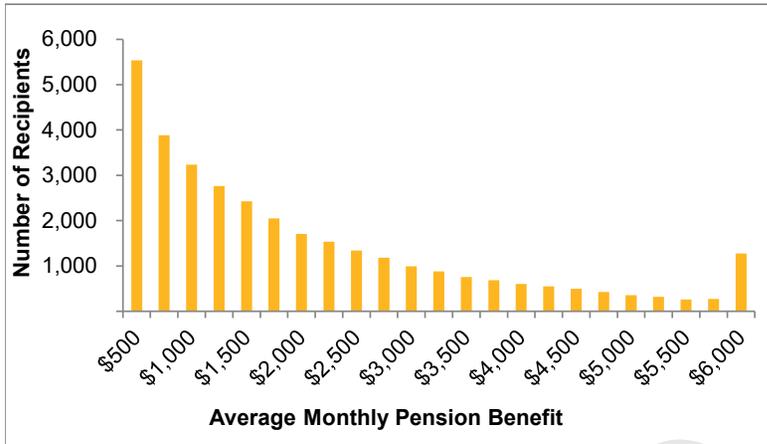
Summary of All Pension Benefit Recipients

Peace Officer / Firefighter



Summary of All Pension Benefit Recipients

Others



Summary of All Pension Benefit Recipients

Peace Officer / Firefighter

Annual Pension Benefit by Age

Age	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	4	170,535	42,634
40 - 44	9	419,501	46,611
45 - 49	78	4,222,898	54,140
50 - 54	181	9,898,063	54,685
55 - 59	352	16,029,002	45,537
60 - 64	613	23,598,866	38,497
65 - 69	785	28,026,653	35,703
70 - 74	757	27,090,153	35,786
75+	789	26,958,125	34,167
Total	3,568	\$136,413,796	\$ 38,233

Annual Pension Benefit by Years Since Commenced

Years Since Comm.	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0	169	\$ 8,847,926	\$ 52,355
1	153	6,820,706	44,580
2	136	6,180,237	45,443
3	169	7,174,157	42,451
4	139	6,662,977	47,935
0 - 4	766	\$ 35,686,003	\$ 46,587
5 - 9	554	21,076,891	38,045
10 - 14	553	16,786,316	30,355
15 - 19	658	22,270,942	33,846
20 - 24	565	20,962,357	37,102
25 - 29	227	8,408,349	37,041
30 - 34	181	8,694,152	48,034
35 - 39	44	1,963,535	44,626
40+	20	565,251	28,263
Total	3,568	\$136,413,796	\$ 38,233

Years Since Commencement by Age

Age	Years Since Commencement									Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0
35 - 39	3	1	0	0	0	0	0	0	0	4
40 - 44	7	1	1	0	0	0	0	0	0	9
45 - 49	64	11	2	0	1	0	0	0	0	78
50 - 54	126	46	8	1	0	0	0	0	0	181
55 - 59	192	83	51	21	3	2	0	0	0	352
60 - 64	184	149	110	138	29	1	1	1	0	613
65 - 69	92	158	169	227	121	16	1	0	1	785
70 - 74	46	66	157	182	195	65	35	6	5	757
75+	52	39	55	89	216	143	144	37	14	789
Total	766	554	553	658	565	227	181	44	20	3,568

Summary of All Pension Benefit Recipients

Others

Annual Pension Benefit by Age

Age	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	1	63,300	63,300
30 - 34	1	6,894	6,894
35 - 39	4	63,537	15,884
40 - 44	11	112,161	10,196
45 - 49	36	487,980	13,555
50 - 54	177	5,491,471	31,025
55 - 59	1,451	45,205,759	31,155
60 - 64	6,150	164,650,026	26,772
65 - 69	8,705	212,069,909	24,362
70 - 74	7,652	166,411,955	21,748
75+	9,350	177,832,889	19,020
Total	33,538	\$772,395,881	\$ 23,030

Annual Pension Benefit by Years Since Commenced

Years Since Comm.	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0	1,582	\$ 45,597,895	\$ 28,823
1	1,537	42,707,950	27,787
2	1,493	41,043,827	27,491
3	1,646	44,281,323	26,902
4	1,650	42,048,630	25,484
0 - 4	7,908	\$215,679,625	\$ 27,274
5 - 9	7,828	196,401,424	25,090
10 - 14	6,449	138,527,538	21,480
15 - 19	4,936	99,050,931	20,067
20 - 24	3,650	74,080,303	20,296
25 - 29	1,529	26,818,320	17,540
30 - 34	942	17,120,376	18,174
35 - 39	235	3,822,001	16,264
40+	61	895,363	14,678
Total	33,538	\$772,395,881	\$ 23,030

Years Since Commencement by Age

Age	Years Since Commencement									
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	1	0	0	0	0	0	0	0	0	1
30 - 34	1	0	0	0	0	0	0	0	0	1
35 - 39	1	3	0	0	0	0	0	0	0	4
40 - 44	4	4	3	0	0	0	0	0	0	11
45 - 49	14	13	6	3	0	0	0	0	0	36
50 - 54	120	30	15	8	3	0	1	0	0	177
55 - 59	1,044	321	53	17	10	5	1	0	0	1,451
60 - 64	3,452	1,984	631	57	13	8	4	1	0	6,150
65 - 69	1,893	3,206	2,672	842	71	14	6	1	0	8,705
70 - 74	745	1,533	2,004	2,390	944	18	10	5	3	7,652
75+	633	734	1,065	1,619	2,609	1,484	920	228	58	9,350
Total	7,908	7,828	6,449	4,936	3,650	1,529	942	235	61	33,538

Section 4.8: Pension Benefit Recipients by Type of Benefit and Option Elected

Peace Officer / Firefighter

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected				
		1	2	3	1	2	3	4	5
\$ 1 – 300	52	18	34	0	37	6	0	2	7
301 – 600	175	109	66	0	93	40	23	7	12
601 – 900	176	99	76	1	103	41	10	12	10
901 – 1,200	168	93	75	0	108	30	16	7	7
1,201 – 1,500	178	113	64	1	103	39	20	7	9
1,501 – 1,800	167	122	45	0	91	43	22	7	4
1,801 – 2,100	154	104	48	2	71	41	32	5	5
2,101 – 2,400	225	170	54	1	102	68	32	13	10
2,401 – 2,700	197	168	25	4	75	67	37	12	6
2,701 – 3,000	228	203	23	2	72	99	35	14	8
3,001 – 3,300	282	248	30	4	95	110	55	11	11
3,301 – 3,600	238	209	26	3	84	95	34	15	10
3,601 – 3,900	191	173	15	3	66	84	27	10	4
3,901 – 4,200	202	193	7	2	58	91	36	13	4
4,200+	935	909	23	3	239	464	155	65	12
Total	3,568	2,931	611	26	1,397	1,318	534	200	119

Type of Pension Benefit

1. Regular Retirement
2. Survivor Payment
3. Disability

Option Selected

1. Whole Life Annuity
2. 75% Joint and Contingent Annuity
3. 50% Joint and Contingent Annuity
4. 66 2/3% Joint and Survivor Annuity
5. Level Income Option

Pension Benefit Recipients by Type of Benefit and Option Elected

Others

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected				
		1	2	3	1	2	3	4	5
\$ 1 – 300	2,100	1,543	556	1	1,022	384	279	63	352
301 – 600	5,092	4,272	812	8	2,680	1,186	807	262	157
601 – 900	4,248	3,529	707	12	2,241	1,030	674	180	123
901 – 1,200	3,476	3,007	464	5	1,708	850	662	168	88
1,201 – 1,500	2,939	2,571	351	17	1,429	770	551	116	73
1,501 – 1,800	2,388	2,115	257	16	1,110	683	447	89	59
1,801 – 2,100	2,018	1,810	191	17	923	549	390	96	60
2,101 – 2,400	1,726	1,574	141	11	749	500	347	82	48
2,401 – 2,700	1,461	1,349	96	16	629	420	299	62	51
2,701 – 3,000	1,216	1,131	80	5	504	394	245	38	35
3,001 – 3,300	1,035	984	45	6	412	332	222	42	27
3,301 – 3,600	891	857	32	2	338	293	194	48	18
3,601 – 3,900	760	731	26	3	297	265	147	36	15
3,901 – 4,200	687	659	28	0	267	226	145	32	17
4,200+	3,501	3,458	39	4	1,178	1,257	814	202	50
Total	33,538	29,590	3,825	123	15,487	9,139	6,223	1,516	1,173

Type of Pension Benefit

1. Regular Retirement
2. Survivor Payment
3. Disability

Option Selected

1. Whole Life Annuity
2. 75% Joint and Contingent Annuity
3. 50% Joint and Contingent Annuity
4. 66 2/3% Joint and Survivor Annuity
5. Level Income Option

Section 4.9: Pension Benefit Recipients Added to and Removed from Rolls

Peace Officer / Firefighter

Year Ended	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	No. ¹	Annual Pension Benefits	No. ¹	Annual Pension Benefits	No. ¹	Annual Pension Benefits		
June 30, 2020	164	\$ 8,472,240	61	\$ 1,078,932	3,568	\$ 136,413,796	5.7%	\$ 38,233
June 30, 2019	149	6,713,940	71	233,335	3,465	129,020,488	5.3%	37,235
June 30, 2018	153	7,002,504	81	2,573,694	3,387	122,539,883	3.7%	36,179
June 30, 2017	165	6,971,580	54	2,132,027	3,315	118,111,073	4.3%	35,629
June 30, 2016	137	6,618,744	49	1,594,392	3,204	113,271,520	4.6%	35,353
June 30, 2015	136	5,617,344	46	633,048	3,116	108,247,168	4.8%	34,739
June 30, 2014	109	4,270,620	50	(145,771)	3,026	103,262,870	4.5%	34,125
June 30, 2013	113	4,162,920	42	240,775	2,967	98,846,479	4.1%	33,315
June 30, 2012	179	5,246,271	41	(177,568)	2,896	94,924,334	6.1%	32,778
June 30, 2011	114	3,772,720	33	116,090	2,758	89,500,495	4.3%	32,451

¹ Numbers are estimated, and include other internal transfers.

Pension Benefit Recipients Added to and Removed from Rolls

Others

Year Ended	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	No. ¹	Annual Pension Benefits	No. ¹	Annual Pension Benefits	No. ¹	Annual Pension Benefits		
June 30, 2020	1,472	\$ 42,340,608	779	\$ 9,911,423	33,538	\$ 772,395,881	4.4%	\$ 23,030
June 30, 2019	1,543	43,301,707	765	3,096,594	32,845	739,966,696	5.7%	22,529
June 30, 2018	1,708	46,316,673	673	10,533,376	32,067	699,761,583	5.4%	21,822
June 30, 2017	1,699	44,619,382	816	14,610,212	31,032	663,978,286	4.7%	21,398
June 30, 2016	1,780	44,409,702	660	12,099,362	30,149	633,969,116	5.4%	21,028
June 30, 2015	1,583	39,939,292	627	7,232,812	29,029	601,658,776	5.7%	20,726
June 30, 2014	1,778	44,823,611	603	3,011,383	28,073	568,952,296	7.9%	20,267
June 30, 2013	1,808	43,247,667	554	4,861,626	26,898	527,140,068	7.9%	19,598
June 30, 2012	1,679	37,855,250	636	5,344,239	25,644	488,754,027	7.1%	19,059
June 30, 2011	1,595	37,100,217	554	6,897,899	24,601	456,243,016	7.1%	18,546

¹ Numbers are estimated, and include other internal transfers.

Section 5: Basis of the Actuarial Valuation

Section 5.1: Summary of Plan Provisions

Effective Date

January 1, 1961, with amendments through June 30, 2020. Chapter 82, 1986 Session Laws of Alaska, created a two-tier retirement system. Members who were first hired under PERS before July 1, 1986 (Tier 1) are eligible for different benefits than members hired after June 30, 1986 (Tier 2). Chapter 4, 1996 Session Laws of Alaska created a third tier for members who were first hired after June 30, 1996 (Tier 3). Chapter 9, 2005 Session Laws of Alaska, closed the plan to new members hired after June 30, 2006.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the system. The Attorney General of the state is the legal counsel for the system and shall advise the administrator and represent the system in legal proceedings.

Prior to June 30, 2005, the Public Employees' Retirement Board prescribed policies and adopted regulations and performed other activities necessary to carry out the provisions of the system. The Alaska State Pension Investment Board, Department of Revenue, Treasury Division was responsible for investing PERS funds.

On July 27, 2005, Senate Bill 141, enacted as Chapter 9, 2005 Session laws of Alaska, replaced the Public Employees' Retirement Board and the Alaska State Pension Investment Board with the Alaska Retirement Management Board.

Employers Included

Currently there are 155 employers participating in PERS, including the State of Alaska and 154 political subdivisions and public organizations. Two additional political subdivisions participate in PERS for healthcare benefits only.

Membership

PERS membership is mandatory for all permanent full-time and part-time employees of the State of Alaska and participating political subdivisions and public organizations, unless they are specifically excluded by Alaska Statute or employer participation agreements. Employees participating in the University of Alaska's Optional Retirement Plan or other retirement plans funded by the State are not covered by PERS. Elected officials may waive PERS membership.

Certain members of the Alaska Teachers' Retirement System (TRS) are eligible for PERS retirement benefits for their concurrent elected public official service with municipalities. In addition, employees who work half-time in PERS and TRS simultaneously are eligible for half-time PERS and TRS credit.

Senate Bill 141, signed into law on July 27, 2005, closes the plan effective July 1, 2006, to new members first hired on or after July 1, 2006.

Credited Service

Permanent employees who work at least 30 hours a week earn full-time credit; part-time employees working between 15 and 30 hours a week earn partial credit based upon the number of hours worked. Members receiving PERS occupational disability benefits continue to earn PERS credit while disabled. Survivors who are receiving occupational death benefits continue to earn PERS service credit while occupational survivor benefits are being paid.

Members may claim other types of service, including:

- part-time State of Alaska service rendered after December 31, 1960, and before January 1, 1976;
- service with the State, former Territory of Alaska, or U.S. Government in Alaska before January 1, 1961;
- past Peace Officer, correctional officer, fire fighter, and special officer service after January 1, 1961;
- military service (not more than five years may be claimed);
- temporary service after December 31, 1960;
- elected official service before January 1, 1981;
- Alaska Bureau of Indian Affairs service;
- past service rendered by employees who worked half-time in PERS and TRS simultaneously;
- leave without pay service after June 13, 1987, while receiving Workers' Compensation;
- Village Public Safety Officer service; and
- service as a temporary employee of the legislature before July 1, 1979, but this service must have been claimed no later than July 1, 2003, or by the date of retirement, if sooner (not more than ten years may be claimed).

Except for service before January 1, 1961, with the State, former Territory of Alaska, or U.S. Government in Alaska, contributions are required for all past service.

Past employment with participating political subdivisions that occurred before the employers joined PERS is creditable if the employers agree to pay the required contributions.

At the election of certain PERS members, certain service may be credited in the same fashion as members in TRS.

Members employed as dispatchers or within a state correctional facility may, at retirement, elect to convert their dispatcher or correctional facility service from "all other" service to Peace Officer/Firefighter service and retire under the 20-year retirement option. Members pay the full actuarial cost of conversion.

Employer Contributions

PERS employers contribute the amounts required, in addition to employees' contributions, to fund the benefits of the system.

The normal cost rate is a uniform rate for all participating employers (less the value of members' contributions).

The past service rate is a uniform rate for all participating employers to amortize the unfunded past service liability with payments that are a level percentage of payroll amount over a closed 25-year period starting June 30, 2014. Effective June 30, 2018, each future year's unfunded service liability is separately amortized on a level percent of pay basis over 25 years.

Employer rates cannot be less than the normal cost rate.

Pursuant to AS 39.35.255 effective July 1, 2008, each PERS employer will pay a simple uniform contribution rate of 22% of member payroll.

Additional State Contributions

Pursuant to AS 39.35.280 effective July 1, 2008, the State shall contribute an amount (in addition to the State contribution as an employer) that, when combined with the employer contribution of 22%, will be sufficient to pay the total contribution rate adopted by the Board.

Member Contributions

Mandatory Contributions: Peace Officer/Firefighter members are required to contribute 7.5% of their compensation; all Others contribute 6.75%. Those all Others who have elected to have their service calculated under TRS rules contribute 9.76% of their compensation. Members' contributions are deducted from gross wages before federal income taxes are withheld.

Contributions for Claimed Service: Member contributions are also required for most of the claimed service described above.

Voluntary Contributions: Members may voluntarily contribute up to 5% of their salary on an after-tax basis. Voluntary contributions are recorded in a separate account and are payable to the:

- a. member in lump sum payment upon termination of employment;
- b. member's beneficiary if the member dies; or
- c. member in a lump sum, life annuity, or payments over a designated period of time when the member retires.

Interest: Members' contributions earn 4.5% interest, compounded semiannually on June 30 and December 31.

Refund of Contributions: Terminated members may receive refunds of their member contribution accounts which includes their mandatory and voluntary contributions, indebtedness payments, and interest earned. Terminated members' accounts may be attached to satisfy claims under Alaska Statute 09.38.065, federal income tax levies, and valid Qualified Domestic Relations Orders.

Reinstatement of Contributions: Refunded accounts and the corresponding PERS service may be reinstated upon reemployment in PERS prior to July 1, 2010. Interest accrues on refunds until paid in full or members retire.

Retirement Benefits

Eligibility

- a. Members, including deferred vested members, are eligible for normal retirement at age 55 or early retirement at age 50 if they were hired before July 1, 1986 (Tier 1), and age 60 or early retirement at age 55 if they were hired on or after July 1, 1986 (Tiers 2 & 3). Additionally, they must have at least:
 - (i) five years of paid-up PERS service;
 - (ii) 60 days of paid-up PERS service as employees of the legislature during each of five legislative sessions and they were first hired by the legislature before May 30, 1987;
 - (iii) 80 days of paid-up PERS service as employees of the legislature during each of five legislative sessions and they were first hired by the legislature after May 29, 1987;
 - (iv) two years of paid-up PERS service and they are vested in TRS; or
 - (v) two years of paid-up PERS service and a minimum three years of TRS service to qualify for a public service benefit.
- b. Members may retire at any age when they have:
 - (i) 20 paid-up years of PERS Peace Officer/Firefighter service; or
 - (ii) 30 paid-up years of PERS "all other" or "elected official" service.

Benefit Type

Lifetime benefits are paid to members. Eligible members may receive normal, unreduced benefits when they (1) reach normal retirement age and complete the service required; or (2) satisfy the minimum service requirements under the "20 and out" or "30 and out" provisions. Members may receive early, actuarially reduced benefits when they reach early retirement age and complete the service required.

Members may select a joint and survivor option. Members who entered PERS prior to July 1, 1996 may also select a 66-2/3 last survivor option or a level income option. Under these options and early retirement, benefits are actuarially adjusted so that members receive the actuarial equivalents of their normal benefit amounts.

Benefit Calculations

Retirement benefits are calculated by multiplying the average monthly compensation (AMC) times credited PERS service times the percentage multiplier. The AMC is determined by averaging the salaries earned during the five highest (three highest for Peace Officer/Firefighter members or members hired prior to July 1, 1996) consecutive payroll years. Members must earn at least 115 days of credit in the last year worked to include it in the AMC calculation. PERS pays a minimum benefit of \$25.00 per month for each year of service when the calculated benefit is less.

The percentage multipliers for Peace Officer/Firefighter members are 2% for the first ten years of service and 2.5% for all service over ten years.

The percentage multipliers for all Others are 2% for the first ten years, 2.25% for the next ten years, and 2.5% for all remaining service earned on or after July 1, 1986. All service before that date is calculated at 2%.

Indebtedness

Members who terminate and refund their PERS contributions are not eligible to retire unless they return to PERS employment and pay back their refunds plus interest or accrue additional service which qualifies them for retirement. PERS refunds must be paid in full if the corresponding service is to count toward the minimum service requirements for retirement. Refunded PERS service is included in total service for the purpose of calculating retirement benefits. However, when refunds are not completely paid before retirement, benefits are actuarially reduced for life. Indebtedness balances may also be created when a member purchases qualified claimed service.

Reemployment of Retired Members

Retirement and retiree healthcare benefits are suspended while retired members are reemployed under PERS. During reemployment, members earn additional PERS service and contributions are withheld from their wages. A member who retired with a normal retirement benefit can elect to waive payment of PERS contributions. The waiver allows the member to continue receiving the retirement benefit during the period of reemployment. Members who elect the waiver option do not earn additional PERS service. The Waiver Option first became effective July 1, 2005 and applies to reemployment periods after that date. The Waiver Option is not available to members who retired early or under the Retirement Incentive Programs (RIPs). The Waiver Option is no longer available after June 30, 2009.

Members retired under the Retirement Incentive Programs (RIPs) who return to employment will:

- a. forfeit the three years of incentive credits that they received;
- b. owe PERS 150% of the benefits that they received for state and political subdivision members, and 110% for school district employees, under the 1996-2000 RIP, which may include costs for health insurance, excluding amounts that they paid to participate for the 1986 and 1989 RIPs. Under prior RIPs, the penalty is 110% of the benefits received; and

- c. be charged 7% interest from the date that they are reemployed until their indebtedness is paid in full or they retire again. If the indebtedness is not completely paid, future benefits will be actuarially reduced for life.

Employers make contributions to the unfunded liability of the plan on behalf of rehired retired members at the rate the employer is making contributions to the unfunded liability of the plan for other members.

Postemployment Healthcare Benefits

Major medical benefits are provided to retirees and their surviving spouses by PERS for all employees hired before July 1, 1986 (Tier 1) and disabled retirees. Employees hired after June 30, 1986 (Tier 2) and their surviving spouses with five years of credited service (or ten years of credited service for those first hired after June 30, 1996 (Tier 3)) must pay the full monthly premium if they are under age sixty and will receive benefits paid by PERS if they are over age sixty. Tier 3 Members with between five and ten years of credited service must pay the full monthly premium regardless of their age. Tier 2 and Tier 3 Members with less than five years of credited service are not eligible for postemployment healthcare benefits. Tier 2 Members who are receiving a conditional benefit and are age eligible are eligible for postemployment healthcare benefits. In addition, Peace Officers and their surviving spouses with twenty-five years of Peace Officer membership service, Other employees and their surviving spouses with thirty years of membership service, and any disabled member receive benefits paid by PERS, regardless of their age or date of hire.

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination. Participants in dental, vision, and audio coverage pay a full self-supporting rate and those benefits are not included in this valuation.

Surviving spouses continue coverage only if a pension payment form that provided survivor benefits was elected. Alternate payees (i.e. individuals who are the subject of a domestic relations order or DRO) are allowed to participate in the plan, but must pay the full cost.

Where premiums are required prior to age 60, the valuation bases this payment upon the age of the retiree.

Participants in the defined benefit plan are covered under the following benefit design:

Plan Feature	Amounts
Deductible (single/family)	\$150 / \$450
Coinsurance (most services)	20%
Outpatient surgery/testing	0%
Maximum Out-of-Pocket (single/family, excluding deductible)	\$800 / \$2,400
Rx Copays (generic/brand/mail-order), does not apply to OOP max	\$4 / \$8 / \$0
Lifetime Maximum	\$2,000,000

The plan coordinates with Medicare on a traditional Coordination of Benefits Method. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.

Disability Benefits

Monthly disability benefits are paid to permanently disabled members until they die, recover, or become eligible for normal retirement. Members are appointed to normal retirement on the first of the month after they become eligible.

Occupational Disability

Members are not required to satisfy age or service requirements to be eligible for occupational disability. Monthly benefits are equal to 40% of their gross monthly compensation on the date of their disability. Members on occupational disability continue to earn PERS service until they become eligible for normal retirement. Peace Officer/Firefighter members may elect to retain the disability benefit formula for the calculation of their normal retirement benefits.

Non-occupational Disability

Members must be vested (five paid up years of PERS service) to be eligible for non-occupational disability benefits. Monthly benefits are calculated based on the member's average monthly compensation and PERS service on the date of termination from employment because of disability. Members do not earn PERS service while on non-occupational disability.

Death Benefits

Monthly death benefits may be paid to a spouse or dependent children upon the death of a member. If monthly benefits are not payable under the occupational and non-occupational death provisions, the designated beneficiary receives the lump sum benefit described below.

Occupational Death

When an active member (vested or non-vested) dies from occupational causes, a monthly survivor's pension may be paid to the spouse. The pension equals 40% of the member's gross monthly compensation on the date of death or disability, if earlier. If there is no spouse, the pension may be paid to the member's dependent children. On the member's normal retirement date, the benefit converts to a normal retirement benefit. The normal benefit is based on the member's salary on the date of death and service, including service accumulated from the date of the member's death to the normal retirement date. Survivors of Peace Officer/Firefighter members receive the greater of 50% of the member's gross monthly compensation on the date of death or disability, or 75% of the member's monthly normal retirement benefit (including service projected to Normal Retirement). If the member is unmarried with no children, a refund of contributions is payable to the estate.

Death after Occupational Disability

When a member dies while occupationally disabled, benefits are paid as described above in Occupational Death.

Non-Occupational Death

When a vested member dies from non-occupational causes, the surviving spouse may elect to receive a monthly 50% joint and survivor benefit or a lump sum benefit. The monthly benefit is calculated on the member's average monthly compensation and PERS service at the time of termination or death.

Lump Sum Non-Occupational Death Benefit

Upon the death of a member who has less than one year of service, the designated beneficiary receives the member's contribution account, which includes mandatory and voluntary contributions, indebtedness payments, and interest earned. If the member has more than one year of PERS service or is vested, the beneficiary also receives \$1,000 and \$100 for each year of PERS service.

Death After Retirement

When a retired member dies, the designated beneficiary receives the member's contribution account, less any benefits already paid and the member's last benefit check. If the member selected a survivor option at retirement, the eligible spouse receives continuing, lifetime monthly benefits.

Postretirement Pension Adjustments

Postretirement pension adjustments (PRPAs) are granted annually to eligible benefit recipients when the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage increases during the preceding calendar year. PRPAs are calculated by multiplying the recipient's base benefit including past PRPAs, but excluding the Alaska COLA, times:

- a. 75% of the CPI increase in the preceding calendar year or 9%, whichever is less, if the recipient is at least age 65 or on PERS disability; or
- b. 50% of the CPI increase in the preceding calendar year or 6%, whichever is less, if the recipient is at least age 60, or under age 60 if the recipient has been receiving benefits for at least five years.

Ad hoc PRPAs, up to a maximum of 4%, may be granted to eligible recipients who were first hired before July 1, 1986 (Tier 1) if the CPI increases and the funded ratio is at least 105%.

In a year where an ad-hoc PRPA is granted, eligible recipients will receive the higher of the two calculations.

Alaska Cost-of-Living Allowance (COLA)

Eligible benefit recipients who reside in Alaska receive an Alaska COLA equal to 10% of their base benefits or \$50, whichever is more. The following benefit recipients are eligible:

- a. members who first entered PERS before July 1, 1986 (Tier 1) and their survivors;
- b. members who first entered PERS after June 30, 1986 (Tiers 2 & 3) and their survivors if they are at least age 65; and
- c. all disabled members.

Changes in Benefit Provisions Valued Since the Prior Valuation

There were no changes in benefit provisions since the prior valuation.

Section 5.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006. Changes in methods were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was changed effective June 30, 2014.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay.

Effective June 30, 2018, the Board adopted a layered UAAL amortization method: Layer #1 equals the sum of (i) the UAAL at June 30, 2018 based on the 2017 valuation, plus (ii) the FY18 experience gain/loss. Layer #1 is amortized over the remainder of the 25-year closed period that was originally established in 2014¹. Layer #2 equals the change in UAAL at June 30, 2018 due to the experience study and EGWP implementation. Layer #2 is amortized over a separate closed 25-year period starting in 2018. Future layers will be created each year based on the difference between actual and expected UAAL occurring that year, and will be amortized over separate closed 25-year periods. The UAAL amortization continues to be on a level percent of pay basis. State statutes allow the contribution rate to be determined on payroll for all members, defined benefit and defined contribution member payroll combined.

Projected pension and postemployment healthcare benefits were determined for all active members. Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year from the assumed entry age to the assumed retirement age were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

¹ Layer #1 is referred to as "initial amount" in Sections 1.2 and 1.3.

Valuation of Assets

The actuarial asset value was reinitialized to equal Fair Value of Assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the gain or loss each year, for a period of five years. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

This section outlines the detailed methodology used in the internal model developed by Buck to calculate the initial per capita claims cost rates for the PERS postemployment healthcare plan. Note that the methodology reflects the results of our annual experience rate update for the period from July 1, 2019 to June 30, 2020.

Base claims cost rates are incurred healthcare costs expressed as a rate per member per year. Ideally, claims cost rates should be derived for each significant component of cost that can be expected to require differing projection assumptions or methods (i.e., medical claims, prescription drug claims, administrative costs, etc). Separate analysis is limited by the availability and historical credibility of cost and enrollment data for each component of cost. This valuation reflects non-prescription claims separated by Medicare status, including eligibility for free Part A coverage. Prescription costs are analyzed separately as in prior valuations. Administrative costs are assumed in the final per capita claims cost rates used for valuation purposes, as described below. Analysis to date on Medicare Part A coverage is limited since Part A claim data is not available by individual, nor is this status incorporated into historical claim data.

Benefits

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan and is available to employees of the State and subdivisions who meet retirement criteria based on the retirement plan tier in effect at their date of hire. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination for those Medicare-eligible. Dental, vision and audio claims (DVA) are excluded from data analyzed for this valuation because those are retiree-pay all benefits where rates are assumed to be self-supporting. Buck relies upon rates set by a third-party for the DVA benefits. Buck reviewed historical rate-setting information and views contribution rate adjustments made are not unreasonable.

Administration and Data Sources

The plan was administered by Wells Fargo Insurance Services (acquired by HealthSmart, in January 2012) from July 1, 2009 through December 31, 2013 and by Aetna effective January 1, 2014.

Claims incurred for the period from July 2018 through June 2020 (FY19 through FY20) were provided by the State of Alaska from reports extracted from their data warehouse, which separated claims by Medicare status. Monthly enrollment data for the same period was provided by Aetna.

Aetna also provided census information identifying Medicare Part B only participants. These participants are identified when hospital claims are denied by Medicare; Aetna then flags that participant as a Part B only participant. Buck added newly identified participants to our list of Medicare Part B only participants. Buck assumes that once identified as Part B only, that participant remains in that status until we are notified otherwise.

Aetna provided a snapshot file as of July 1, 2020 of retirees and dependents that included a coverage level indicator. The monthly enrollment data includes double coverage participants. These are participants whereby both the retiree and spouse are retirees from the State and both are reflected with Couple coverage in the enrollment. In this case, such a couple would show up as four members in the

monthly enrollment (each would be both a retiree and a spouse). As a result, the snapshot census file was used to adjust the total member counts in the monthly enrollment reports to estimate the number of unique participants enrolled in coverage. Based on the snapshot files from the last two valuations, the total member count in the monthly enrollment reports needs to be reduced by approximately 13% to account for the number of participants with double coverage.

Aetna does not provide separate experience by Medicare status in standard reporting so the special reports mentioned above from the data warehouse were used this year to obtain that information and incorporate it into the per capita rate development for each year of experience (with corresponding weights applied in the final per capita cost).

Methodology

Buck projected historical claim data to FY21 for retirees using the following summarized steps:

1. Develop historical annual incurred claim cost rates – an analysis of medical costs was completed based on claims information and enrollment data provided by the State of Alaska and Aetna for each year in the experience period of FY19 through FY20.
 - Costs for medical services and prescriptions were analyzed separately, and separate trend rates were developed to project expected future medical and prescription costs for the valuation year (e.g. from the experience period up through FY21).
 - Because the reports provided reflected incurred claims, no additional adjustment was needed to determine incurred claims to be used in the valuation.
 - An offset for costs expected to be reimbursed by Medicare was incorporated beginning at age 65. Alaska retirees who do not have 40 quarters of Medicare-covered compensation do not qualify for Medicare Part A coverage free of charge. This is a relatively small and closed group. Medicare was applied to State employment for all employees hired after March 31, 1986. For the “no-Part A” individuals who are required to enroll in Medicare Part B, the State is the primary payer for hospital bills and other Part A services. Claim experience is not available separately for participants with both Medicare Parts A and B and those with Part B only. For Medicare Part B only participants, a lower average claims cost was applied to retirees covered by both Medicare Part A and B vs. retirees covered only by Medicare Part B based upon manual rate models that estimate the Medicare covered proportion of medical costs. To the extent that no-Part A claims can be isolated and applied strictly to the appropriate closed group, actuarial accrued liability will be more accurate.
 - Based on census data received from Aetna, less than 1% of the current retiree population was identified as having coverage only under Medicare Part B. We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.
 - Based upon a reconciliation of valuation census data to the snapshot eligibility files provided by Aetna as of July 1, 2019, and July 1, 2020, Buck adjusted member counts used for duplicate records where participants have double coverage; i.e. primary coverage as a retiree and secondary coverage as the covered spouse of another retiree. This is to reflect the total cost per distinct individual/member which is then applied to distinct members in the valuation census.
 - Buck understands that pharmacy claims reported do not reflect rebates. Based on actual pharmacy rebate information provided by Aetna for years through 2018 and Optum for January 2019 through June 2020, rebates were assumed to be 17% of prescription drug claims for FY19 and 19.5% of prescription drug claims for FY20.
2. Develop estimated EGWP reimbursements – Segal provided estimated 2021 EGWP subsidies, developed with the assistance of OptumRx. These amounts are applicable only to Medicare-eligible participants.

3. Adjust for claim fluctuation, anomalous experience, etc. – explicit adjustments are often made for anticipated large claims or other anomalous experience. FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. Due to group size and demographics, we did not make any additional large claim adjustments. We do blend both Alaska plan-specific and national trend factors as described below. Buck compared data utilized to lag reports and quarterly plan experience presentations provided by the State and Aetna to assess accuracy and reasonableness of data.
4. Trend all data points to the projection period – project prior years’ experience forward to FY21 for retiree benefits on an incurred claim basis. Trend factors derived from historical Alaska-specific experience and national trend factors are shown in the table in item 5 below.
5. Apply credibility to prior experience – adjust prior year’s data by assigning weight to recent periods, as shown at the right of the table below. The Board approved a change in the weighting of experience periods beginning with the June 30, 2017 valuation as outlined below. Note also that we averaged projected plan costs using Alaska-specific trend factors and national trend factors, assigning 75% weight to Alaska-specific trends and 25% to national trends:

Alaska-Specific and National Average Weighted Trend from Experience Period to Valuation Year			
Experience Period	Medical	Prescription	Weighting Factors
FY19 to FY20	7.3% Pre-Medicare / 4.6% Medicare	1.2%	50%
FY20 to FY21	6.3% Pre-Medicare / 5.2% Medicare	7.6%	50%

Trend assumptions used for rate development are assessed annually and as additional/improved reporting becomes available, we will incorporate into rate development as appropriate.

6. Develop separate administration costs – no adjustments were made for internal administrative costs. Third party retiree plan administration fees for FY21 are based upon total fees projected to 2021 by Segal based on actual FY20 fees. The annual per participant per year administrative cost rate for medical and prescription benefits is \$449.

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, and was in effect at the time the legislation was enacted, not all provisions of the health reform legislation apply to the State plan. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. We reviewed the impact of including these provisions, but there was no decision made to adopt them, and no requirement to do so.

Because Transitional Reinsurance fees are only in effect until 2016, we excluded these for valuation purposes.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

Data

In accordance with actuarial standards, we note the following specific data sources and steps taken to value retiree medical benefits:

The Division of Retirement and Benefits provided pension valuation census data, which for people currently in receipt of healthcare benefits was supplemented by coverage data from the healthcare claims administrator (Aetna).

Certain adjustments and assumptions were made to prepare the data for valuation:

- Some records provided on the Aetna data were associated with a participant social security number not listed on the RIN-to-SSN translation file. We reconciled those participants with the pension valuation data as either a surviving spouse or a retiree in the appropriate plan based on account structure information in the Aetna data.
- All records provided with retiree medical coverage on the Aetna data were included in this valuation and we relied on the Aetna data as the source of medical coverage for current retirees and their dependents.
- Some records in the Aetna data were duplicates due to the double coverage (i.e. coverage as a retiree and as a spouse of another retiree) allowed under the plan. Records were adjusted for these members so that each member was only valued once. Any additional value of the double coverage (due to coordination of benefits) is small and reflected in the per capita costs.
- Covered children included in the Aetna data were valued until age 23, unless disabled. We assumed that those dependents over 23 were only eligible and valued due to being disabled.
- For individuals included in the pension data expecting a future pension, we valued health benefits starting at the same point that the pension benefit is assumed to start.

We are not aware of any other data issues that would be expected to have a material impact on the results and there are no unresolved matters related to the data.

The chart below shows the basis of setting the per capita claims cost assumption, which includes both PERS and TRS.

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
A. Fiscal 2019				
1. Incurred Claims	\$ 230,731,518	\$ 80,855,220	\$ 63,846,605	\$ 183,281,273
2. Adjustments for Rx Rebates	0	0	(10,853,923)	(31,157,816)
3. Net incurred claims	\$ 230,731,518	\$ 80,855,220	\$ 52,992,682	\$ 152,123,456
4. Average Enrollment	20,625	42,843	20,625	42,843
5. Claim Cost Rate (3) / (4)	11,187	1,887	2,569	3,551
6. Trend to Fiscal 2021	1.141	1.101	1.089	1.089
7. Fiscal 2021 Incurred Cost Rate (5) x (6)	\$ 12,762	\$ 2,077	\$ 2,798	\$ 3,867

B. Fiscal 2020				
1. Incurred Claims	\$ 229,531,664	\$ 89,497,345	\$ 64,442,660	\$ 188,022,328
2. Adjustments for Rx Rebates	0	0	(12,566,319)	(36,664,354)
3. Net incurred claims	\$ 229,531,664	\$ 89,497,345	\$ 51,876,341	\$ 151,357,974
4. Average Enrollment	19,354	44,965	19,354	44,965
5. Claim Cost Rate (3) / (4)	11,860	1,990	2,680	3,366
6. Trend to Fiscal 2021	1.063	1.052	1.076	1.076
7. Fiscal 2021 Incurred Cost Rate (5) x (6)	\$ 12,609	\$ 2,094	\$ 2,885	\$ 3,623

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
C. Incurred Cost Rate by Fiscal Year				
1. Fiscal 2019 A.(7)	12,762	2,077	2,798	3,867
2. Fiscal 2020 B.(7)	12,609	2,094	2,885	3,623

D. Weighting by Fiscal Year				
1. Fiscal 2019	50%	50%	50%	50%
2. Fiscal 2020	50%	50%	50%	50%

E. Fiscal 2021 Incurred Cost Rate				
1. Rate at Average Age C x D	\$ 12,685	\$ 2,086	\$ 2,842	\$ 3,745
2. Average Aging Factor	0.826	1.263	0.838	1.121
3. Rate at Age 65 (1) / (2)	\$ 15,360	\$ 1,651	\$ 3,393	\$ 3,340

F. Development of Part A&B and Part B Only Cost from Pooled Rate Above	
1. Part A&B Average Enrollment	44,568
2. Part B Only Average Enrollment	398
3. Total Medicare Average Enrollment B(4)	44,965
4. Cost ratio for those with Part B only to those with Parts A&B	3.300
5. Factor to determine cost for those with Parts A&B (2) / (3) x (4) + (1) / (3) x 1.00	1.020
6. Medicare per capita cost for all participants: E(3)	\$ 1,651
7. Cost for those eligible for Parts A&B: (6) / (5)	\$ 1,618
8. Cost for those eligible for Part B only: (7) x (4)	\$ 5,340

Following the development of total projected costs, a distribution of per capita claims cost was developed. This was accomplished by allocating total projected costs to the population census used in the valuation. The allocation was done separately for each of prescription drugs and medical costs for the Medicare eligible and pre-Medicare populations. The allocation weights were developed using participant counts by age and assumed morbidity and aging factors. Results were tested for reasonableness based on historical trend and external benchmarks for costs paid by Medicare.

Below are the results of this analysis:

**Distribution of Per Capita Claims Cost by Age
for the Period July 1, 2020 through June 30, 2021**

Age	Medical and Medicare Parts A & B	Medical and Medicare Part B Only	Prescription Drug	Medicare EGWP Subsidy
45	\$ 9,374	\$ 9,374	\$ 2,072	\$ 0
50	10,605	10,605	2,461	0
55	11,999	11,999	2,923	0
60	13,576	13,576	3,149	0
65	1,618	5,340	3,340	1,003
70	1,876	6,191	3,688	1,107
75	2,174	7,177	4,071	1,223
80	2,401	7,923	3,971	1,192

Section 5.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2020 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

91% of male and 96% of female rates of RP-2014 healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Tables 2a and 2b).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement. Disabilities are assumed to be occupational 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others.

Retirement

Retirement rates based upon the 2013-2017 actual experience (see Tables 4a and 4b).

Deferred vested members are assumed to retire at their earliest unreduced retirement date.

The modified cash refund annuity is valued as a three-year certain and life annuity.

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Pension

For Others, 75% of male members and 70% of female members are assumed to be married. For Peace Officer/Firefighters, 85% of male members and 60% of female members are assumed to be married.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. For Others, 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse. For Peace Officer/Firefighters, 75% of male members and 50% of female members are assumed to be married and cover a dependent spouse.

Dependent Children

- Pension: None
- Healthcare: Benefits for dependent children have been valued only for members currently covering their dependent children. These benefits are only valued through the dependent children's age 23 (unless the child is disabled).

Contribution Refunds

For Others, 5% of terminating members with vested benefits are assumed to have their contributions refunded.

For Peace Officers/Firefighters, 10% of terminating members with vested benefits are assumed to have their contributions refunded.

100% of those with non-vested benefits are assumed to have their contributions refunded.

Imputed Data

Data changes from the prior year which are deemed to have an immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Active Rehire Assumption

The Normal Cost used for determining contribution rates and in the projections includes a rehire assumption to account for anticipated rehires. The Normal Cost shown in the report includes the following assumptions (which were developed based on the five years of rehire loss experience through June 30, 2017). For projections, these assumptions were assumed to grade to zero uniformly over a 20-year period.

- Pension: 18.77%
- Healthcare: 17.09%

Re-Employment Option

All re-employed retirees are assumed to return to work under the Standard Option.

Active Data Adjustment

No adjustment was made to reflect participants who terminate employment before the valuation date and are subsequently rehired after the valuation date.

Alaska Cost-of-Living Adjustments (COLA)

Of those benefit recipients who are eligible for the Alaska COLA, 70% of Others and 65% of Peace Officers/Firefighters are assumed to remain in Alaska and receive the COLA.

Postretirement Pension Adjustment (PRPA)

50% and 75% of assumed inflation, or 1.25% and 1.875% respectively, is valued for the annual automatic PRPA as specified in the statute.

Expenses

The investment return assumption is net of investment expenses. The Normal Cost as of June 30, 2020 was increased by the following amounts for administrative expenses (for projections, the percent increase was assumed to remain constant in future years):

- Pension: \$7,223,000
- Healthcare: \$4,934,000

Part-Time Status

Part-time employees are assumed to earn 1.00 years of credited service per year for Peace Officer/Firefighter and 0.75 years of credited service per year for Other members.

Service

Total credited service is provided by the State. This service is assumed to be the only service that should be used to calculate benefits. Additionally, the State provides claimed service (including Bureau of Indian Affairs Service). Claimed service is used for vesting and eligibility purposes as described in Section 5.1.

Final Average Earnings

Final Average Earnings is provided on the data for active members. This amount is used as a minimum in the calculation of the average earnings in the future.

Per Capita Claims Cost

Sample claims cost rates adjusted to age 65 for FY21 medical and prescription drugs are shown below:

	Medical	Prescription Drugs
Pre-Medicare	\$ 15,360	\$ 3,393
Medicare Parts A & B	\$ 1,618	\$ 3,340
Medicare Part B Only	\$ 5,340	\$ 3,340
Medicare Part D – EGWP	N/A	\$ 1,003

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2021 fiscal year (July 1, 2020 – June 30, 2021).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

\$449 per person per year; assumed to increase at 4.5% per year.

Medicare Part B Only

We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.

Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.5% is applied to the FY21 pre-Medicare medical claims costs to get the FY22 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY21	6.5%	5.4%	7.5%
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retired Member Contributions for Medical Benefits

Currently contributions are required for PERS members who are under age 60 and have less than 30 years of service (25 for Peace Officer/Firefighter). Eligible Tier 1 members are exempt from contribution requirements. Annual FY21 contributions based on monthly rates shown below for calendar 2021 are assumed based on the coverage category for current retirees. The composite rate shown is used for current active and inactive members in Tier 2 or 3 who are assumed to retire prior to age 60 with less than 30 years of service and who are not disabled. For dependent children, we value 1/3 of the annual retiree contribution to estimate the per child rate based upon the assumed number of children in rates where children are covered.

Coverage Category	Calendar 2021 Annual Contribution	Calendar 2021 Monthly Contribution	Calendar 2020 Monthly Contribution
Retiree Only	\$ 8,448	\$ 704	\$ 741
Retiree and Spouse	\$ 16,896	\$ 1,408	\$ 1,482
Retiree and Child(ren)	\$ 11,940	\$ 995	\$ 1,047
Retiree and Family	\$ 20,388	\$ 1,699	\$ 1,788
Composite	\$ 12,552	\$ 1,046	\$ 1,101

Trend Rate for Retired Member Medical Contributions

The table below shows the rate used to project the retired member medical contributions from the shown fiscal year to the next fiscal year. For example, 0.0% is applied to the FY21 retired member medical contributions to get the FY22 retired member medical contributions.

Trend Assumptions	
FY21	0.0%
FY22	0.0%
FY23+	4.0%

Graded trend rates for retired member medical contributions are consistent with the rates used for the June 30, 2019 valuation. Actual FY21 retired member medical contributions are reflected in the valuation.

Healthcare Participation

100% of system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible. 20% of non-system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible.

Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. Retired member contributions were updated to reflect the 5% decrease from CY20 to CY21. The amounts included in the Normal Cost for administrative expenses were changed from \$6,839,000 to \$7,223,000 for pension and from \$3,744,000 to \$4,934,000 for healthcare (based on the most recent two years of actual administrative expenses paid from plan assets).

DRAFT

Table 1: Salary Scales

Peace Officer / Firefighter		Others	
Years of Service	Percent Increase	Years of Service	Percent Increase
0	7.75%	0	6.75%
1	7.25%	1	6.25%
2	6.75%	2	5.75%
3	6.25%	3	5.25%
4	5.75%	4	4.75%
5	5.25%	5	4.25%
6	4.75%	6	3.75%
7	4.25%	7	3.65%
8	3.75%	8	3.55%
9	3.65%	9	3.45%
10	3.55%	10	3.35%
11	3.45%	11	3.25%
12	3.35%	12	3.15%
13	3.25%	13	3.05%
14	3.15%	14	2.95%
15	3.05%	15	2.85%
16	2.95%	16	2.75%
17	2.85%	17	2.75%
18+	2.75%	18+	2.75%

Table 2a: Turnover Rates for Peace Officer / Firefighter

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	15.00%	15.00%
1	12.00%	8.00%
2	7.20%	6.40%
3	5.67%	5.60%
4	6.48%	7.20%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	4.70%	6.80%	39	2.04%	2.98%
23	4.46%	6.80%	40	1.68%	3.39%
24	4.22%	6.80%	41	1.67%	3.37%
25	3.98%	6.80%	42	1.67%	3.36%
26	3.74%	6.80%	43	1.71%	3.33%
27	3.50%	6.80%	44	1.76%	3.31%
28	3.32%	6.63%	45	1.81%	3.28%
29	3.14%	6.46%	46	1.85%	3.25%
30	2.96%	6.29%	47	1.90%	3.23%
31	2.79%	6.12%	48	2.22%	3.19%
32	2.61%	5.95%	49	2.53%	3.15%
33	2.50%	5.36%	50	3.18%	6.42%
34	2.39%	4.77%	51	4.24%	6.32%
35	2.28%	4.18%	52	4.24%	6.19%
36	2.17%	3.60%	53	4.24%	6.04%
37	2.06%	3.01%	54	4.24%	3.00%
38	2.05%	2.99%	55+	3.00%	2.00%

Table 2b: Turnover Rates for Others

Select Rates during the First 5 Years of Employment

Hire Age Under 35			Hire Age Over 35		
Years of Service	Male	Female	Years of Service	Male	Female
0	29.00%	29.00%	0	20.00%	20.00%
1	16.25%	20.00%	1	12.00%	15.00%
2	13.00%	16.00%	2	10.00%	12.50%
3	10.40%	12.80%	3	8.50%	10.00%
4	8.45%	10.40%	4	8.50%	9.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	11.40%	12.99%	39	5.47%	5.23%
23	10.83%	12.21%	40	4.86%	5.65%
24	10.26%	11.43%	41	4.71%	5.51%
25	9.69%	10.65%	42	4.56%	5.38%
26	9.12%	9.87%	43	4.50%	5.19%
27	8.55%	9.09%	44	4.44%	4.99%
28	8.30%	8.72%	45	4.39%	4.80%
29	8.05%	8.34%	46	4.33%	4.60%
30	7.80%	7.97%	47	4.27%	4.41%
31	7.54%	7.60%	48	4.26%	4.40%
32	7.29%	7.23%	49	4.24%	4.39%
33	6.99%	6.88%	50	3.63%	4.45%
34	6.69%	6.53%	51	3.60%	4.43%
35	6.39%	6.17%	52	3.56%	4.40%
36	6.10%	5.82%	53	3.52%	4.37%
37	5.80%	5.47%	54	4.17%	6.20%
38	5.63%	5.35%	55+	3.00%	5.00%

Table 3: Disability Rates

Age	Peace Officer / Firefighter		Others	
	Male	Female	Male	Female
< 23	0.0179%	0.0112%	0.0327%	0.0376%
23	0.0244%	0.0153%	0.0360%	0.0400%
24	0.0310%	0.0194%	0.0392%	0.0424%
25	0.0374%	0.0234%	0.0425%	0.0448%
26	0.0440%	0.0275%	0.0456%	0.0472%
27	0.0505%	0.0316%	0.0489%	0.0496%
28	0.0526%	0.0329%	0.0501%	0.0510%
29	0.0548%	0.0343%	0.0513%	0.0524%
30	0.0570%	0.0356%	0.0524%	0.0538%
31	0.0591%	0.0370%	0.0536%	0.0554%
32	0.0612%	0.0383%	0.0548%	0.0568%
33	0.0634%	0.0397%	0.0566%	0.0586%
34	0.0657%	0.0411%	0.0584%	0.0606%
35	0.0679%	0.0425%	0.0602%	0.0624%
36	0.0702%	0.0439%	0.0620%	0.0644%
37	0.0724%	0.0453%	0.0638%	0.0662%
38	0.0757%	0.0473%	0.0669%	0.0696%
39	0.0789%	0.0493%	0.0701%	0.0728%
40	0.0822%	0.0514%	0.0734%	0.0762%
41	0.0854%	0.0534%	0.0765%	0.0794%
42	0.0887%	0.0554%	0.0797%	0.0826%
43	0.0977%	0.0611%	0.0879%	0.0908%
44	0.1066%	0.0667%	0.0962%	0.0990%
45	0.1157%	0.0723%	0.1043%	0.1072%
46	0.1247%	0.0780%	0.1125%	0.1154%
47	0.1337%	0.0836%	0.1208%	0.1236%
48	0.1462%	0.0914%	0.1329%	0.1360%
49	0.1588%	0.0993%	0.1451%	0.1484%
50	0.1714%	0.1071%	0.1572%	0.1608%
51	0.1839%	0.1150%	0.1694%	0.1734%
52	0.1965%	0.1228%	0.1815%	0.1858%
53	0.2294%	0.1434%	0.2132%	0.2168%
54	0.2624%	0.1640%	0.2450%	0.2478%

Table 4a: Retirement Rates for Peace Officer / Firefighter

Age	Reduced		Unreduced	
	Male	Female	Male	Female
< 47	N/A	N/A	88.00%	6.00%
47	N/A	N/A	88.00%	15.00%
48	N/A	N/A	14.30%	15.00%
49	N/A	N/A	14.30%	15.00%
50	5.00%	5.00%	16.50%	15.00%
51	5.00%	7.00%	16.50%	15.00%
52	7.00%	7.00%	20.35%	15.00%
53	7.00%	7.00%	20.35%	15.00%
54	7.00%	35.00%	20.35%	25.00%
55	7.00%	8.00%	27.50%	20.00%
56	7.00%	8.00%	27.50%	15.00%
57	7.00%	8.00%	27.50%	15.00%
58	7.00%	8.00%	27.50%	15.00%
59	20.00%	20.00%	27.50%	15.00%
60	N/A	N/A	33.00%	25.00%
61	N/A	N/A	27.50%	20.00%
62	N/A	N/A	27.50%	30.00%
63	N/A	N/A	27.50%	50.00%
64	N/A	N/A	22.00%	50.00%
65	N/A	N/A	22.00%	50.00%
66	N/A	N/A	27.50%	50.00%
67	N/A	N/A	55.00%	50.00%
68	N/A	N/A	55.00%	50.00%
69	N/A	N/A	55.00%	50.00%
70+	N/A	N/A	100.00%	100.00%

Table 4b: Retirement Rates for Others

Age	Reduced		Unreduced	
	Male	Female	Male	Female
< 50	N/A	N/A	11.00%	11.00%
50	6.00%	8.00%	33.00%	38.50%
51	6.00%	8.00%	35.75%	38.50%
52	9.00%	8.00%	35.75%	38.50%
53	6.00%	8.00%	35.75%	38.50%
54	20.00%	15.00%	38.50%	38.50%
55	6.00%	6.00%	33.00%	33.00%
56	6.00%	6.00%	22.00%	22.00%
57	6.00%	6.00%	22.00%	19.80%
58	6.00%	6.00%	22.00%	19.80%
59	15.00%	20.00%	22.00%	19.80%
60	N/A	N/A	22.00%	23.10%
61	N/A	N/A	22.00%	22.00%
62	N/A	N/A	22.00%	22.00%
63	N/A	N/A	22.00%	22.00%
64	N/A	N/A	22.00%	22.00%
65	N/A	N/A	24.75%	28.60%
66	N/A	N/A	27.50%	28.60%
67	N/A	N/A	22.00%	24.20%
68	N/A	N/A	24.75%	24.20%
69	N/A	N/A	27.50%	24.20%
70	N/A	N/A	27.50%	24.20%
71	N/A	N/A	27.50%	24.20%
72	N/A	N/A	27.50%	27.50%
73	N/A	N/A	27.50%	27.50%
74	N/A	N/A	27.50%	38.50%
75	N/A	N/A	55.00%	55.00%
76	N/A	N/A	55.00%	55.00%
77	N/A	N/A	55.00%	55.00%
78	N/A	N/A	55.00%	55.00%
79	N/A	N/A	55.00%	55.00%
80+	N/A	N/A	100.00%	100.00%

Section 6: Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important.

Actuarial Standard of Practice No. 51 (ASOP 51)¹ requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plan's future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the 7.38% expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk – potential that future salaries will be different than expected in the actuarial valuation
- Inflation Risk – potential that the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage is different than the 2.5% assumed in the valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

¹ ASOP 51 does not apply to the healthcare portion of the plan. Accordingly, all figures in this section relate to the pension portion.

Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.4 of this report. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plan when the employer's and/or State's actual contribution amount and the actuarially determined contribution differ.

- If the actual contribution is lower than the actuarially determined contribution, the plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).
- As long as the Board consistently adopts the actuarially determined contributions, this risk is mitigated due to Alaska statutes requiring the State to contribute additional funds necessary to pay the total contributions adopted by the Board.

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plan's asset allocation will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase actuarial accrued liability by approximately 12%.
- This risk may be increased due to the plan being closed to new entrants. As the plan continues to mature, the magnitude of negative cash flow discussed in the Plan Maturity Measures later in this section will grow, thereby creating a need for more liquid assets that may not garner the same long-term return as currently assumed.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plan could increase.

- The mortality assumption for the plan mitigates this risk by assuming future improvement in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the plan.
- The Postretirement Pension Adjustments and Alaska Cost-of-Living Allowance increase longevity risk because members who live longer than expected will incur more benefit payment increases than expected and therefore increase costs.

Salary Increase Risk

Plan costs will be increased if actual salary increases are larger than expected.

- Higher-than-expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Inflation Risk

Plan costs will be increased if the actual CPI for Anchorage is greater than the 2.5% assumed in the valuation.

- Retirement benefits will be greater than expected if the CPI is greater than the assumed rate, which will increase costs.
- This risk is mitigated by the 75% and 50% of CPI provisions and the 9% and 6% maximums.
- This risk is also mitigated by the age and time in payment requirements to receive an increase.
- Inflation risk may be associated with the interaction of inflation with other assumptions, but this is not significant as a standalone assumption, and therefore is considered as part of the associated assumption risk instead of being discussed here.

Other Demographic Risk

The plan is subject to risks associated with other demographic assumptions (e.g., retirement, termination, and retired members remaining in Alaska assumptions). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plan. The demographic assumptions used in the valuation are re-evaluated regularly as part of the four-year experience studies to ensure the assumptions are consistent with long-term expectations.

Historical Information

Monitoring certain information over time may help understand risks faced by the plan. Historical information is included throughout this report. Some examples are:

- Funded Ratio History shown in the Executive Summary illustrates how the plan's funded status (comparison of actuarial accrued liabilities to actuarial value of assets) has changed over time.
- Section 1.6 shows historical analysis of financial experience including how contribution rates have changed over time.
- Section 2.4 shows the volatility of asset returns over time.
- Section 4 includes various historical information showing how member census data has changed over time.

Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability (\$'s in \$000's)	June 30, 2019	June 30, 2020
1. Retiree and Beneficiary Accrued Liability	\$ 10,076,528	\$ 10,472,466
2. Total Accrued Liability	\$ 15,039,180	\$ 15,279,525
3. Ratio, (1) ÷ (2)	67.0%	68.5%

A high percentage of liability concentrated on participants in pay status indicates a mature plan (often a ratio above 60% - 65%). Because the plan was closed to new entrants in 2006, we expect the percentage in item #3 to continue to increase over time. An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption and increased costs. Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions creating an increased reliance on investment returns. This ratio should be monitored each year in the future.

Ratio of Cash Flow to Assets (\$'s in \$000's)	FYE June 30, 2019	FYE June 30, 2020
1. Contributions	\$ 498,067	\$ 504,029
2. Benefit Payments	848,019	895,523
3. Cash Flow, (1) - (2)	\$ (349,952)	\$ (391,494)
4. Fair Value of Assets	\$ 9,489,405	\$ 9,469,161
5. Ratio, (3) ÷ (4)	(3.7%)	(4.1%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the trust. Negative cash flow indicates the trust needs to rely on investment returns to cover benefit payments and / or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which can increase the investment risk. Currently, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. However, due to the plan being closed, we expect this measure to become increasingly negative over time. This maturity measure should be monitored in the future.

Contribution Volatility (\$'s in \$000's)	June 30, 2019	June 30, 2020
1. Fair Value of Assets	\$ 9,489,405	\$ 9,469,161
2. DB/DCR Payroll	\$ 2,347,306	\$ 2,373,078
3. Asset to Payroll Ratio, (1) ÷ (2)	404.3%	399.0%
4. Accrued Liability	\$ 15,039,180	\$ 15,279,525
5. Liability to Payroll Ratio, (4) ÷ (2)	640.7%	643.9%

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10% may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5%. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent, the plan with a liability-to-payroll ratio of 10% may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5%.

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 67 and 68

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013 and defines new financial reporting requirements for public pension plans.

Governmental Accounting Standards Board Statement Number 68 amends Number 27 effective for fiscal years beginning after June 15, 2014 and defines new accounting and financial reporting requirements for employers sponsoring public pension plans.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans. Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

DRAFT



State of Alaska

Teachers' Retirement System

Actuarial Valuation Report
As of June 30, 2020

January 2021

DRAFT



January 22, 2021

State of Alaska

The Alaska Retirement Management Board

The Department of Revenue, Treasury Division

The Department of Administration, Division of Retirement and Benefits

P.O. Box 110203

Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Teachers' Retirement System (TRS) as of June 30, 2020 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2020. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under TRS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of TRS as of June 30, 2020.

TRS is funded by Employer, State, and Member Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board) and as required by Alaska state statutes. The funding objective for TRS is to pay required contributions that remain level as a percent of total TRS compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability (UAAL) as a level percentage of total TRS compensation over a closed 25-year period as required by Alaska state statutes. The closed 25-year period was originally established effective June 30, 2014. Effective June 30, 2018, the Board adopted a 25-year layered UAAL amortization method as described in Section 5.2. The UAAL amortization continues to be on a level percent of pay basis. The compensation used to determine required contributions is the total compensation of all active members in TRS, including those hired after July 1, 2006 who are members of the Defined Contribution Retirement (DCR) Plan. This objective is currently being met and is projected to continue to be met. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status (on a combined pension/healthcare basis) is expected to increase to 100% in FY35.

The Board and staff of the State of Alaska may use this report for the review of the operations of TRS. Use of this report, for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claim cost rates effective June 30, 2020 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 5.2 and 5.3.

Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67) was effective for TRS beginning with fiscal year ending June 30, 2014, and Statement No. 74 (GASB 74) was effective for TRS beginning with fiscal year ending June 30, 2017. Separate GASB 67 and GASB 74 reports as of June 30, 2020 have been prepared. We have also prepared the member data tables shown in Section 4 of this report for the Statistical Section of the CAFR, as well as the summary of actuarial assumptions and analysis of financial experience for the Actuarial Section of the CAFR. Please see our separate GASB 67 and GASB 74 reports for other information needed for the CAFR.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the healthcare portion of TRS. See Section 6 of this report for further details regarding ASOP 51.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies

to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Additional models used in valuing health benefits are described later in the report.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. A more detailed explanation on these adjustments is shown in Section 5.2.

This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

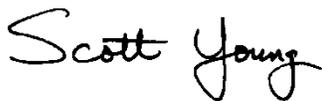
I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,



David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

Contents

Executive Summary	1
Section 1: Actuarial Funding Results	8
Section 1.1: Actuarial Liabilities and Normal Cost	8
Section 1.2: Actuarial Contributions as of June 30, 2020	10
Section 1.3: Roll-Forward Contribution Rate Calculation for FY23	12
Section 1.4: Actuarial Gain/(Loss) for FY20	15
Section 1.5: Development of Change in Unfunded Liability During FY20	16
Section 1.6: Analysis of Financial Experience	17
Section 1.7: History of Unfunded Liability and Funded Ratio	20
Section 2: Plan Assets	21
Section 2.1: Summary of Fair Value of Assets	21
Section 2.2: Changes in Fair Value of Assets During FY20	22
Section 2.3: Development of Actuarial Value of Assets	23
Section 2.4: Historical Asset Rates of Return	25
Section 3: Projections	26
Section 3.1: Projection Assumptions and Methods	26
Section 3.2: Membership Projection	27
Section 3.3: Projected Employer/State Contribution Rates	30
Section 3.4: Projected Employer/State Contribution Amounts	31
Section 3.5: Projection of Funded Ratios	32
Section 3.6: Table of Projected Actuarial Results	33
Section 3.7: Projected Pension Benefit Recipients and Amounts	35
Section 4: Member Data	36
Section 4.1: Summary of Members Included	36
Section 4.2: Age and Service Distribution of Active Members	40
Section 4.3: Member Data Reconciliation	41
Section 4.4: Schedule of Active Member Data	43
Section 4.5: Active Member Payroll Reconciliation	44
Section 4.6: Summary of New Pension Benefit Recipients	45
Section 4.7: Summary of All Pension Benefit Recipients	47
Section 4.8: Pension Benefit Recipients by Type of Benefit and Option Elected	50
Section 4.9: Pension Benefit Recipients Added to and Removed from Rolls	51

Section 5: Basis of the Actuarial Valuation	52
Section 5.1: Summary of Plan Provisions.....	52
Section 5.2: Description of Actuarial Methods and Valuation Procedures	59
Section 5.3: Summary of Actuarial Assumptions.....	66
Section 6: Actuarial Standard of Practice No. 51	77
Glossary of Terms	81

DRAFT

Executive Summary

Overview

The State of Alaska Teachers' Retirement System (TRS) provides pension and postemployment healthcare benefits to teachers and other eligible participants. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of TRS as of the valuation date of June 30, 2020.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer/State contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of TRS based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Actuarial projections are also performed to provide a long-term view of the expected future funded status and contribution patterns (see Section 3). The future funded status and contribution patterns would be different than those shown in Section 3 if future experience does not match the actuarial assumptions used in the projections.

Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30 (\$'s in 000's)	2019	2020
---	------	------

Pension

a. Actuarial Accrued Liability	\$ 7,388,020	\$ 7,447,036
b. Valuation Assets	<u>5,563,931</u>	<u>5,587,064</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 1,824,089	\$ 1,859,972
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	75.3%	75.0%
e. Fair Value of Assets	\$ 5,511,929	\$ 5,444,799
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	74.6%	73.1%

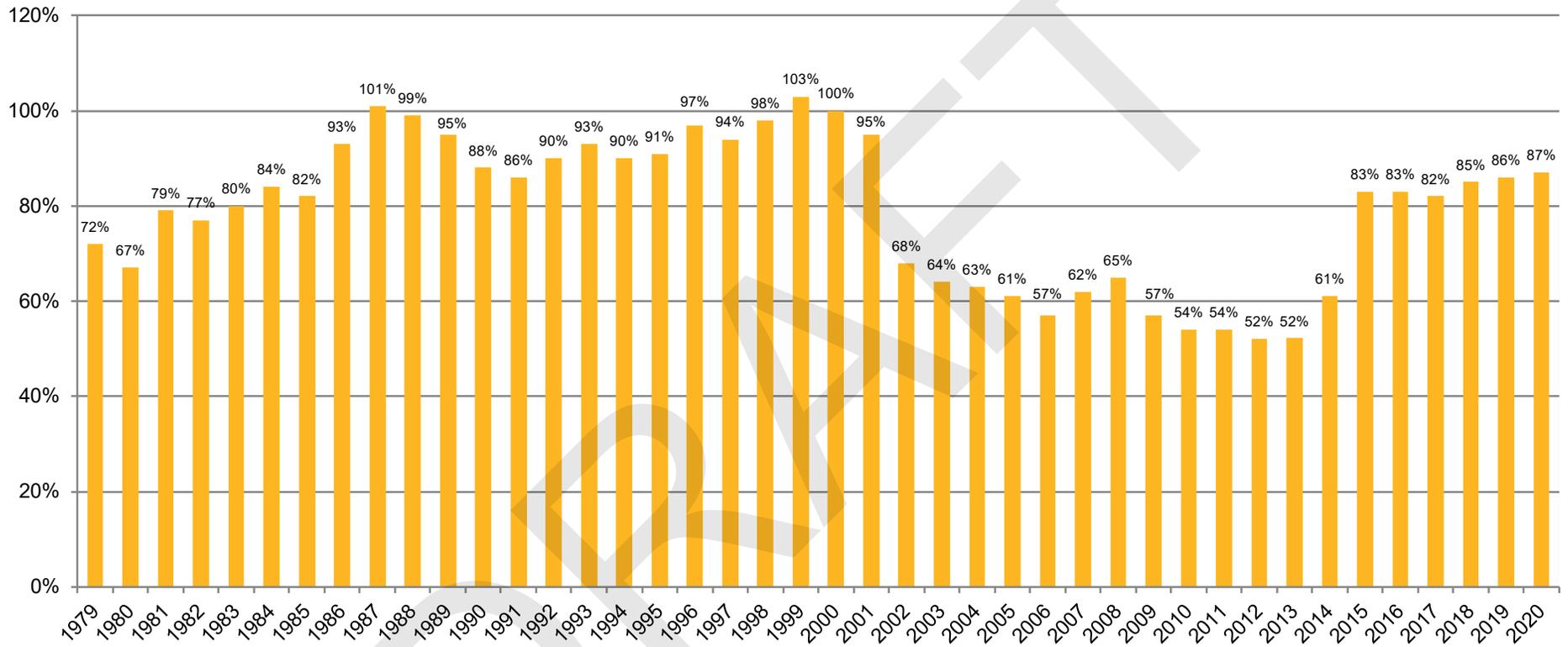
Healthcare

a. Actuarial Accrued Liability	\$ 2,518,644	\$ 2,489,675
b. Valuation Assets	<u>2,947,562</u>	<u>3,021,283</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (428,918)	\$ (531,608)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	117.0%	121.4%
e. Fair Value of Assets	\$ 2,929,319	\$ 2,953,461
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	116.3%	118.6%

Total

a. Actuarial Accrued Liability	\$ 9,906,664	\$ 9,936,711
b. Valuation Assets	<u>8,511,493</u>	<u>8,608,347</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 1,395,171	\$ 1,328,364
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	85.9%	86.6%
e. Fair Value of Assets	\$ 8,441,248	\$ 8,398,260
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	85.2%	84.5%

Funded Ratio History (Based on Valuation Assets)



The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions, so there is potential for actuarial gains or losses.

1. Investment Experience

The actuarial asset value was reinitialized to equal fair value of assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the investment gain or loss each year, for a period of five years. The FY20 investment return based on fair value of assets was approximately 4.1% compared to the expected investment return of 7.38% (net of investment expenses of approximately 0.29%). This resulted in a market asset loss of approximately \$274 million. Due to the recognition of investment gains and losses over a 5-year period, the FY20 investment return based on actuarial value of assets was approximately 5.8%, which resulted in an actuarial asset loss of approximately \$140 million.

2. Salary Increases

Salary increases for continuing active members during FY20 were less than expected based on the valuation assumptions, resulting in a liability gain of approximately \$6 million.

3. Demographic Experience

Section 4 provides statistics on active and inactive participants. The number of active participants decreased 6.3% from 4,044 at June 30, 2019 to 3,789 at June 30, 2020 due to active members exiting the plan during the year (due to retirement, termination, death, and disability) and the closure of the plan to new entrants as of July 1, 2006. The average age of active participants increased from 51.48 to 51.92 and average credited service increased from 19.21 to 19.76 years.

The number of benefit recipients increased 1.5% from 13,491 to 13,689, and their average age increased from 71.30 to 71.85. The number of vested terminated participants decreased 5.9% from 812 to 764. Their average age increased from 51.71 to 52.37.

The overall effect of the demographic experience during FY20 was a liability loss of approximately \$15 million (pension) and a liability gain of approximately \$8¹ million (healthcare).

4. COLA / PRPA Experience

The cost-of-living increases (COLA) for benefit recipients during FY20 were less than expected based on the valuation assumptions, resulting in a liability gain of approximately \$2 million. The postretirement pension adjustments (PRPA) were also less than expected, resulting in a liability gain of approximately \$41 million.

5. Retiree Medical Claims Experience

As described in Section 5.2, recent medical claims experience and changes in healthcare enrollment data provided to us for the June 30, 2020 valuation generated a liability gain of approximately \$98 million. The decrease in retired member contributions from CY20 to CY21 generated a liability loss of approximately \$1 million. Reduced claims during FY20, largely attributable to COVID-19, generated a liability gain of approximately \$17 million.

6. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

¹ Includes the effects of changes in dependent coverage elections and Medicare Part B only experience.

7. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. Retired member contributions were updated to reflect the 5% decrease from CY20 to CY21. The amounts included in the Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

8. Changes in Benefit Provisions Since the Prior Valuation

There have been no changes in benefit provisions valued since the prior valuation.

Comparative Summary of Contribution Rates

Pension	Actual FY 2022	Estimated FY 2023
a. Normal Cost Rate Net of Member Contributions	2.40%	2.24%
b. Past Service Cost Rate	<u>20.11%</u>	<u>20.17%</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a) ¹	22.51%	22.41%

Healthcare	Actual FY 2022	Estimated FY 2023
a. Normal Cost Rate	2.98%	2.72%
b. Past Service Cost Rate	<u>(4.09)%</u>	<u>(5.39)%</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a) ¹	2.98%	2.72%

Total	Actual FY 2022	Estimated FY 2023
a. Normal Cost Rate Net of Member Contributions	5.38%	4.96%
b. Past Service Cost Rate	<u>20.11%</u>	<u>20.17%</u>
c. Total Employer/State Contribution Rate, (a) + (b) ¹	25.49%	25.13%
d. Board Adopted Total Employer/State Contribution Rate	25.49%	TBD
e. Defined Contribution Retirement (DCR) Rate Paid by Employers	<u>6.36%</u>	<u>6.72%</u>
f. Board Adopted Total Rate, Including DCR Rate Paid by Employers, (d) + (e)	31.85%	TBD

Contribution rates are based on total (DB and DCR) payroll. The contribution rates shown above for FY23 are estimated assuming no actuarial gains/losses during FY21 and FY22. Actual FY23 contribution rates will be adopted by the Board in September 2021 reflecting FY21 asset experience.

Contribution rates include Employer contribution rates as limited by Alaska state statutes and the Additional State Contribution required under SB 125.

¹ Beginning with the June 30, 2014 valuation, contribution rates for FY17 and beyond are determined using new methodology in accordance with 2014 legislation under HB 385 and SB 119, 2014 Alaska Laws, which changed the amortization methodology to a closed 25-year period as a level percentage of pay, and eliminated the time lag on the contribution rate calculation by using a 2-year "roll-forward" approach assuming 0% population growth. Investment gains and losses are recognized over a 5-year period beginning in FY15. Beginning with the June 30, 2018 valuation, the UAAL amortization was changed as described in Section 5.2.

Summary of Actuarial Accrued Liability Gain/(Loss) and Other Changes During the Year

The following table summarizes the sources of change in the total Employer/State contribution rate as of June 30, 2019 and June 30, 2020 based on DB and DCR payroll combined:

	Pension	Healthcare	Total
1. Total Employer/State Contribution Rate as of June 30, 2019	21.41%	3.57%	24.98%
2. Change due to:			
a. Health Claims Experience	N/A	(0.95)%	(0.95)%
b. Salary Increases	(0.06)%	N/A	(0.06)%
c. Investment Experience	0.83%	0.38%	1.21%
d. Demographic Experience and Miscellaneous ¹	(0.28)%	0.49%	0.21%
e. Contribution Lag	(0.17)%	(0.19)%	(0.36)%
f. Assumption Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
g. Total Change, (a) + (b) + (c) + (d) + (e) + (f)	0.32%	(0.27)%	0.05%
3. Total Employer/State Contribution Rate as of June 30, 2020, (1) + (2)(g)	21.73%	3.30%	25.03%

The following table shows the FY20 gain/(loss) on actuarial accrued liability as of June 30, 2020 (\$'s in 000's):

	Pension	Healthcare	Total
Retirement Experience	\$ 4,822	\$ 2,189	\$ 7,011
Termination Experience	(8,327)	(1,260)	(9,587)
Disability Experience	(337)	31	(306)
Active Mortality Experience	1,370	(564)	806
Inactive Mortality Experience	(12,531)	(1,712)	(14,243)
Salary Increases	6,443	N/A	6,443
Rehires (Net of Rehire Load)	(691)	5,506	4,815
COLA Increases	2,280	N/A	2,280
PRPA Increases	41,109	N/A	41,109
Per Capita Claims Cost	N/A	96,760	96,760
COVID-19 Experience	N/A	17,345	17,345
Medicare Part B Only Experience	N/A	2,089	2,089
Changes in Dependent Coverage Elections	N/A	7,435	7,435
Programming Changes ²	518	N/A	518
Miscellaneous ³	<u>(3,776)</u>	<u>(4,433)</u>	<u>(8,209)</u>
Total	\$ 30,880	\$ 123,386	\$ 154,266

¹ Includes the effects of census data changes between the two valuations.

² Includes adjustments to (a) the 75% PRPA for disabilities to commence immediately, and (b) the mortality applied during the COLA deferral period for Tier 2 members.

³ Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories.

The rehire gain/(loss) amount shown on the previous page is the difference between (i) the increase in Actuarial Accrued Liability at June 30, 2020 due to rehires during the most recent plan year, and (ii) the load that was added to the June 30, 2019 Normal Cost based on the rehire load assumption used in the June 30, 2019 valuation. The development of the FY20 rehire gain/(loss) amount is shown in the table below (\$'s in 000's):

	Pension	Healthcare	Total
1. Increase/(Decrease) in Actuarial Accrued Liability at June 30, 2020 due to Rehires	\$ 8,019	\$ (2,686)	\$ 5,333
2. June 30, 2019 Normal Cost Rehire Load, with interest to June 30, 2020	\$ 7,328	\$ 2,820	\$ 10,148
3. Rehire Gain/(Loss), (2) - (1)	\$ (691)	\$ 5,506	\$ 4,815

Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	\$ 1,918,363	\$ 1,742,632
Termination Benefits	30,139	8,750
Disability Benefits	2,174	(1,705)
Death Benefits	13,098	11,038
Return of Contributions	2,412	(35,755)
Medical and Prescription Drug Benefits	932,788	794,982
Medicare Part D Subsidy	(95,471)	(82,011)
Indebtedness	<u>(27,277)</u>	<u>(27,277)</u>
Subtotal	\$ 2,776,226	\$ 2,410,654
Inactive Members		
Not Vested	\$ 39,398	\$ 39,398
Vested Terminations		
- Retirement Benefits	144,442	144,442
- Medical and Prescription Drug Benefits	249,766	249,766
- Medicare Part D Subsidy	(26,215)	(26,215)
- Indebtedness	(5,112)	(5,112)
Retirees & Beneficiaries		
- Retirement Benefits	5,570,625	5,570,625
- Medical and Prescription Drug Benefits	1,814,335	1,814,335
- Medicare Part D Subsidy	<u>(261,182)</u>	<u>(261,182)</u>
Subtotal	\$ 7,526,057	\$ 7,526,057
Total	\$ 10,302,283	\$ 9,936,711
Total Pension	\$ 7,688,262	\$ 7,447,036
Total Medical, Net of Part D Subsidy	\$ 2,614,021	\$ 2,489,675
Total Medical, Gross of Part D Subsidy	\$ 2,996,889	\$ 2,859,083

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
By Tier		
Tier 1		
- Pension	\$ 4,526,587	\$ 4,517,771
- Medical, Net of Part D Subsidy	1,145,879	1,141,946
Tier 2		
- Pension	3,161,675	2,929,265
- Medical, Net of Part D Subsidy	1,468,142	1,347,729
Total	\$ 10,302,283	\$ 9,936,711

As of June 30, 2020	Normal Cost
Active Members	
Retirement Benefits	\$ 30,508
Termination Benefits	3,673
Disability Benefits	662
Death Benefits	379
Return of Contributions	6,658
Medical and Prescription Drug Benefits	22,867
Medicare Part D Subsidy	(2,286)
Rehire Assumption (Pension)	6,521
Rehire Assumption (Medical)	2,476
Administrative Expenses (Pension)	3,003
Administrative Expenses (Medical)	1,362
Total	\$ 75,823
Total Pension	\$ 51,404
Total Medical, Net of Part D Subsidy	\$ 24,419
Total Medical, Gross of Part D Subsidy	\$ 26,705

By Tier	
Tier 1	
- Pension	\$ 3,032
- Medical, Net of Part D Subsidy	1,245
Tier 2	
- Pension	48,372
- Medical, Net of Part D Subsidy	23,174
Total	\$ 75,823

Section 1.2: Actuarial Contributions as of June 30, 2020 (\$'s in 000's)

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	\$ 51,404	\$ 24,419	\$ 75,823
2. DB Rate Payroll Projected for FY21	349,236	349,236	349,236
3. DCR Rate Payroll Projected for FY21	391,854	391,854	391,854
4. Total Rate Payroll Projected for FY21	741,090	741,090	741,090
5. Normal Cost Rate			
a. Based on DB Rate Payroll, (1) ÷ (2)	14.72%	6.99%	21.71%
b. Based on Total Rate Payroll, (1) ÷ (4)	6.94%	3.30%	10.24%
6. Average Member Contribution Rate ¹	4.08%	0.00%	4.08%
7. Employer Normal Cost, (5)(b) - (6)	2.86%	3.30%	6.16%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	\$ 7,447,036	\$ 2,489,675	\$ 9,936,711
2. Valuation Assets	5,587,064	3,021,283	8,608,347
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ 1,859,972	\$ (531,608)	\$ 1,328,364
4. Funded Ratio, (2) ÷ (1)	75.0%	121.4%	86.6%
5. Past Service Cost Amortization Payment	139,825	(35,712)	104,113
6. Total Rate Payroll Projected for FY21	741,090	741,090	741,090
7. Past Service Rate, (5) ÷ (6)	18.87%	(4.82%)	14.05%
Total Employer / State Contribution Rate, not less than Normal Cost Rate	21.73%	3.30%	25.03%
Normal Cost Rate by Tier (Total Employer and Member)²			
Tier 1	15.36%	6.31%	21.67%
Tier 2	14.68%	7.03%	21.71%

¹ Assumes no member contributions from members in the DCR plan, 9.65% contributions for Tier 1 members who elected supplemental coverage, and 8.65% for the remaining members.

² Rates determined considering the payroll for members in each tier. DCR payroll is excluded from these calculations.

Schedule of Past Service Cost Amortizations - Pension (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 1,720,344	\$ 1,706,391	\$ 129,723
Experience Study	6/30/2018	23	14,346	14,451	978
FY19 Loss	6/30/2019	24	94,314	94,735	6,257
FY20 Loss	6/30/2020	25	44,395	44,395	2,867
Total				\$ 1,859,972	\$ 139,825

Schedule of Past Service Cost Amortizations - Healthcare (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ (48,285)	\$ (47,894)	\$ (3,641)
Experience Study and EGWP	6/30/2018	23	(166,274)	(167,496)	(11,335)
FY19 Gain	6/30/2019	24	(213,757)	(214,711)	(14,182)
FY20 Gain	6/30/2020	25	(101,507)	(101,507)	(6,554)
Total				\$ (531,608)	\$ (35,712)

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Amount	6/30/2018	19	\$ 1,672,059	\$ 1,658,497	\$ 126,082
Experience Study and EGWP	6/30/2018	23	(151,928)	(153,045)	(10,357)
FY19 Gain	6/30/2019	24	(119,443)	(119,976)	(7,925)
FY20 Gain	6/30/2020	25	(57,112)	(57,112)	(3,687)
Total				\$ 1,328,364	\$ 104,113

Section 1.3: Roll-Forward Contribution Rate Calculation for FY23 (\$'s in 000's)

	Pension	Healthcare	Total
1. Liability Roll Forward			
a. Actuarial Accrued Liability as of June 30, 2020	\$ 7,447,036	\$ 2,489,675	\$ 9,936,711
b. Normal Cost	48,401	23,057	71,458
c. Interest on (a) and (b) at 7.38%	553,163	185,440	738,603
d. Estimated Benefit Payments	(513,035)	(133,002)	(646,037)
e. Interest on (d) at 7.38%, adjusted for timing	(20,174)	(4,820)	(24,994)
f. Expected Actuarial Accrued Liability as of June 30, 2021	\$ 7,515,391	\$ 2,560,350	\$ 10,075,741
g. Projected Normal Cost	43,895	21,191	65,086
h. Interest on (f) and (g) at 7.38%	557,875	190,518	748,393
i. Estimated Benefit Payments	(531,408)	(139,541)	(670,949)
j. Interest on (i) at 7.38%, adjusted for timing	(20,896)	(5,057)	(25,953)
k. Expected Actuarial Accrued Liability as of June 30, 2022	\$ 7,564,857	\$ 2,627,461	\$ 10,192,318
2. Asset Roll Forward			
a. Actuarial Value of Assets as of June 30, 2020	\$ 5,587,064	\$ 3,021,283	\$ 8,608,347
b. Interest on (a) at 7.38%	412,325	222,971	635,296
c. Employee Contributions	33,592	0	33,592
d. Employer Contributions	22,455	25,197	47,652
e. State Assistance Contributions	134,976	0	134,976
f. Interest on (c) thru (e) at 7.38%, adjusted for timing*	11,993	913	12,906
g. Estimated Benefit Payments	(513,035)	(133,002)	(646,037)
h. Administrative Expenses	(3,003)	(1,362)	(4,365)
i. Interest on (g) and (h) at 7.38%, adjusted for timing	(20,282)	(4,870)	(25,152)
j. AVA Adjustments	(13,377)	(4,007)	(17,384)
k. Expected Actuarial Value of Assets as of June 30, 2021	\$ 5,652,708	\$ 3,127,123	\$ 8,779,831
l. Interest on (k) at 7.38%	417,170	230,782	647,952
m. Employee Contributions	31,234	0	31,234
n. Employer Contributions	24,057	22,264	46,321
o. State Assistance Contributions**	142,665	0	142,665
p. Interest on (m) thru (o) at 7.38%, adjusted for timing*	12,533	807	13,340
q. Estimated Benefit Payments	(531,408)	(139,541)	(670,949)
r. Administrative Expenses	(2,742)	(1,259)	(4,001)
s. Interest on (q) and (r) at 7.38%, adjusted for timing	(20,995)	(5,103)	(26,098)
t. AVA Adjustments	(60,500)	(29,290)	(89,790)
u. Expected Actuarial Value of Assets as of June 30, 2022	\$ 5,664,722	\$ 3,205,783	\$ 8,870,505
3. Expected Unfunded Actuarial Accrued Liability as of June 30, 2022, 1(k) - 2(u)	\$ 1,900,135	\$ (578,322)	\$ 1,321,813

* Employee and Employer Contributions are paid throughout the year. State Assistance Contributions are assumed to be paid on July 1, 2020 for FY21, and July 1, 2021 for FY22.

** The FY22 State Assistance Contribution is expected to be contributed 100% to pension.

	Pension	Healthcare	Total
4. Expected Annual Rate Payroll for FY23			
a. Defined Benefit Members			\$ 291,514
b. Defined Contribution Retirement Members			463,287
c. Total Rate Payroll			\$ 754,801
5. Expected FY23 Contribution Rate Calculation			
a. Projected Normal Cost for FY23	\$ 42,117	\$ 20,540	\$ 62,657
b. Projected Normal Cost Rate for FY23	5.58%	2.72%	8.30%
c. Expected Member Contribution Rate for FY23	(3.34%)	0.00%	(3.34%)
d. Expected Employer Normal Cost Rate for FY23	2.24%	2.72%	4.96%
e. Expected Unfunded Liability as of June 30, 2022	\$ 1,900,135	\$ (578,322)	\$ 1,321,813
f. FY23 Layered Amortization of Expected Unfunded Liability	152,229	(40,720)	111,509
g. Expected Past Service Cost Contribution Rate for FY23	20.17%	(5.39%)	20.17%
h. Expected Total Contribution Rate for FY23, not less than Normal Cost Rate	22.41%	2.72%	25.13%

The components of the expected FY23 amortization amounts are shown below (totals may not add due to rounding):

Expected FY23 Schedule of Past Service Cost Amortizations - Pension (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment for FY23
	Date Created	Years Remaining as of June 30, 2022	Initial	Outstanding as of June 30, 2022	
Initial Amount	6/30/2018	17	\$ 1,720,344	\$ 1,674,843	\$ 136,956
Experience Study	6/30/2018	21	14,346	14,455	1,032
FY19 Loss	6/30/2019	22	94,314	95,115	6,606
FY20 Loss	6/30/2020	23	44,395	44,722	3,027
Expected FY21 Loss	6/30/2021	24	15,589	15,658	1,034
Expected FY22 Loss	6/30/2022	25	55,342	55,342	3,574
Total				\$ 1,900,135	\$ 152,229

Expected FY23 Schedule of Past Service Cost Amortizations - Healthcare (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment for FY23
	Date Created	Years Remaining as of June 30, 2022	Initial	Outstanding as of June 30, 2022	
Initial Amount	6/30/2018	17	\$ (48,285)	\$ (47,009)	\$ (3,844)
Experience Study and EGWP	6/30/2018	21	(166,274)	(167,555)	(11,967)
FY19 Gain	6/30/2019	22	(213,757)	(215,572)	(14,973)
FY20 Gain	6/30/2020	23	(101,507)	(102,254)	(6,920)
Expected FY21 Gain	6/30/2021	24	(34,281)	(34,434)	(2,274)
Expected FY22 Gain	6/30/2022	25	(11,498)	(11,498)	(742)
Total				\$ (578,322)	\$ (40,720)

Expected FY23 Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment for FY23
	Date Created	Years Remaining as of June 30, 2022	Initial	Outstanding as of June 30, 2022	
Initial Amount	6/30/2018	17	\$ 1,672,059	\$ 1,627,834	\$ 133,112
Experience Study and EGWP	6/30/2018	21	(151,928)	(153,100)	(10,935)
FY19 Gain	6/30/2019	22	(119,443)	(120,457)	(8,367)
FY20 Gain	6/30/2020	23	(57,112)	(57,532)	(3,893)
Expected FY21 Gain	6/30/2021	24	(18,692)	(18,776)	(1,240)
Expected FY22 Loss	6/30/2022	25	43,844	43,844	2,832
Total				\$ 1,321,813	\$ 111,509

Section 1.4: Actuarial Gain/(Loss) for FY20 (\$'s in 000's)

	Pension	Healthcare	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2019	\$ 7,388,020	\$ 2,518,644	\$ 9,906,664
b. Normal Cost	50,654	24,458	75,112
c. Interest on (a) and (b) at 7.38%	548,974	187,681	736,655
d. Employer Group Waiver Plan	0	11,705	11,705
e. Benefit Payments	(488,748)	(125,310)	(614,058)
f. Refund of Contributions	(1,699)	0	(1,699)
g. Interest on (d) thru (f) at 7.38%, adjusted for timing	(19,285)	(4,117)	(23,402)
h. Assumptions/Methods Changes	0	0	0
i. Expected Actuarial Accrued Liability as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$ 7,477,916	\$ 2,613,061	\$ 10,090,977
2. Actual Actuarial Accrued Liability as of June 30, 2020	7,447,036	2,489,675	9,936,711
3. Liability Gain/(Loss), (1)(i) - (2)	\$ 30,880	\$ 123,386	\$ 154,266
4. Expected Actuarial Asset Value			
a. Actuarial Value of Assets as of June 30, 2019	\$ 5,563,931	\$ 2,947,562	\$ 8,511,493
b. Interest on (a) at 7.38%	410,618	217,530	628,148
c. Employee Contributions	33,566	0	33,566
d. Employer Contributions	33,204	18,788	51,992
e. State Assistance Contributions	141,129	0	141,129
f. Employer Group Waiver Plan	0	11,705	11,705
g. Interest on (c) thru (f) at 7.38%, adjusted for timing	12,835	1,105	13,940
h. Benefit Payments	(488,748)	(125,310)	(614,058)
i. Refund of Contributions	(1,699)	0	(1,699)
j. Administrative Expenses	(2,988)	(1,372)	(4,360)
k. Interest on (h) thru (j) at 7.38%, adjusted for timing	(19,394)	(4,591)	(23,985)
l. Expected Actuarial Asset Value as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) + (k)	\$ 5,682,454	\$ 3,065,417	\$ 8,747,871
5. Actual Actuarial Asset Value as of June 30, 2020	5,587,064	3,021,283	8,608,347
6. Actuarial Asset Value Gain/(Loss), (5) - (4)(l)	\$ (95,390)	\$ (44,134)	\$ (139,524)
7. Total Actuarial Gain/(Loss), (3) + (6)	\$ (64,510)	\$ 79,252	\$ 14,742
8. Contribution Gain/(Loss)	\$ 19,953	\$ 22,132	\$ 42,085
9. Administrative Expense Gain/(Loss)	\$ 162	\$ 123	\$ 285
10. FY20 Gain/(Loss), (7) + (8) + (9)	\$ (44,395)	\$ 101,507	\$ 57,112

Section 1.5: Development of Change in Unfunded Liability During FY20 (\$'s in 000's)

	Pension	Healthcare	Total
1. 2019 Unfunded Liability	\$ 1,824,089	\$ (428,918)	\$ 1,395,171
a. Interest on Unfunded Liability at 7.38%	\$ 134,618	\$ (31,654)	\$ 102,964
b. Normal Cost	50,654	24,458	75,112
c. Employee Contributions	(33,566)	0	(33,566)
d. Employer Contributions	(33,204)	(18,788)	(51,992)
e. State Assistance Contributions	(141,129)	0	(141,129)
f. Administrative Expenses	2,988	1,372	4,360
g. Interest on (b) thru (f) at 7.38%, adjusted for timing	(8,988)	1,174	(7,814)
h. Assumptions/Methods Changes	0	0	0
i. Expected Change in Unfunded Liability During FY20 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$ (28,627)	\$ (23,438)	\$ (52,065)
2. Expected 2020 Unfunded Liability, (1) + (1)(i)	\$ 1,795,462	\$ (452,356)	\$ 1,343,106
a. Liability (Gain)/Loss During FY20	\$ (30,880)	\$ (123,386)	\$ (154,266)
b. Actuarial Assets (Gain)/Loss During FY20	95,390	44,134	139,524
c. Total Actuarial (Gain)/Loss During FY20	\$ 64,510	\$ (79,252)	\$ (14,742)
3. Actual 2020 Unfunded Liability, (2) + (2)(c)	\$ 1,859,972	\$ (531,608)	\$ 1,328,364

Section 1.6: Analysis of Financial Experience

Pension

**Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience**

Type of (Gain) or Loss	Change in Employer / State Contribution Rate During Fiscal Year				
	Pension				
	2016	2017	2018	2019	2020
1. Health Claims	N/A	N/A	N/A	N/A	N/A
2. Salary Experience	(0.29%)	(0.34%)	(0.39%)	(0.06%)	(0.06%)
3. Investment Experience	1.29%	1.12%	0.91%	0.93%	0.83%
4. Demographic Experience and Miscellaneous	0.02%	(0.47%)	0.37%	0.75%	(0.28%)
5. Contribution Lag	<u>0.04%</u>	<u>(0.07%)</u>	<u>(0.03%)</u>	<u>(0.15%)</u>	<u>(0.17%)</u>
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	1.06%	0.24%	0.86%	1.47%	0.32%
7. Assumptions / Method Changes	1.42%	0.00%	(0.32%)	0.00%	0.00%
8. System Benefit Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	2.48%	0.24%	0.54%	1.47%	0.32%
10. Beginning Total Employer / State Contribution Rate	<u>16.68%</u>	<u>19.16%</u>	<u>19.40%</u>	<u>19.94%</u>	<u>21.41%</u>
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	19.16%	19.40%	19.94%	21.41%	21.73%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	20.86%	20.71%	20.94%	22.51%	22.41% *
b. Fiscal Year for which Rate Applies	FY19	FY20	FY21	FY22	FY23

* Expected rate. Actual rate to be determined

Healthcare

**Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience**

Type of (Gain) or Loss	Change in Employer / State Contribution Rate During Fiscal Year				
	Healthcare				
	2016	2017	2018	2019	2020
1. Health Claims ¹	0.00%	(2.32%)	(1.58%)	(2.51%)	(0.95%)
2. Salary Experience	N/A	N/A	N/A	N/A	N/A
3. Investment Experience	0.67%	0.56%	0.45%	0.45%	0.38%
4. Demographic Experience and Miscellaneous	0.00%	(0.71%)	1.49%	1.60%	0.49%
5. Contribution Lag	<u>(0.50%)</u>	<u>(0.11%)</u>	<u>0.05%</u>	<u>(0.02%)</u>	<u>(0.19%)</u>
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	0.17%	(2.58%)	0.41%	(0.48%)	(0.27%)
7. Assumptions / Method Changes	0.24%	3.41%	0.24%	0.00%	0.00%
8. System Benefit Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	0.41%	0.83%	0.65%	(0.48%)	(0.27%)
10. Beginning Total Employer / State Contribution Rate	<u>2.16%</u>	<u>2.57%</u>	<u>3.40%</u>	<u>4.05%</u>	<u>3.57%</u>
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	2.57%	3.40%	4.05%	3.57%	3.30%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	2.70%	3.91%	3.40%	2.98%	2.72% *
b. Fiscal Year for which Rate Applies	FY19	FY20	FY21	FY22	FY23

* Expected rate. Actual rate to be determined

¹ The 2016 health claims percentage includes the effect of healthcare demographic experience gain/loss

Total
Change in Employer / State Contribution Rate as of Valuation Date
Due to (Gains) and Losses in Actuarial Accrued Liabilities During the Last Five Fiscal Years
Resulting from Differences Between Assumed Experience and Actual Experience

Type of (Gain) or Loss	Change in Employer / State Contribution Rate During Fiscal Year				
	2016	2017	2018	2019	2020
1. Health Claims ¹	0.00%	(2.32%)	(1.58%)	(2.51%)	(0.95%)
2. Salary Experience	(0.29%)	(0.34%)	(0.39%)	(0.06%)	(0.06%)
3. Investment Experience	1.96%	1.68%	1.36%	1.38%	1.21%
4. Demographic Experience and Miscellaneous	0.02%	(1.18%)	1.86%	2.35%	0.21%
5. Contribution Lag	<u>(0.46%)</u>	<u>(0.18%)</u>	<u>0.02%</u>	<u>(0.17%)</u>	<u>(0.36%)</u>
6. (Gain) or Loss During Year From Experience, (1) + (2) + (3) + (4) + (5)	1.23%	(2.34%)	1.27%	0.99%	0.05%
7. Assumptions / Method Changes	1.66%	3.41%	(0.08%)	0.00%	0.00%
8. System Benefit Changes	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
9. Composite (Gain) or Loss During Year, (6) + (7) + (8)	2.89%	1.07%	1.19%	0.99%	0.05%
10. Beginning Total Employer / State Contribution Rate	<u>18.84%</u>	<u>21.73%</u>	<u>22.80%</u>	<u>23.99%</u>	<u>24.98%</u>
11. Ending Valuation Year Employer / State Contribution Rate, (9) + (10)	21.73%	22.80%	23.99%	24.98%	25.03%
12. Fiscal Year Rates Adopted by ARMB					
a. Fiscal Year Employer / State Contribution Rate	23.56%	24.62%	24.34%	25.49%	25.13% *
b. Fiscal Year for which Rate Applies	FY19	FY20	FY21	FY22	FY23

* Expected rate. Actual rate to be determined

¹ The 2016 health claims percentage includes the effect of healthcare demographic experience gain/loss

Section 1.7: History of Unfunded Liability and Funded Ratio (\$'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2003	\$ 5,835,609	\$ 3,752,285	64.3%	\$ 2,083,324
June 30, 2004	6,123,600	3,845,370	62.8%	2,278,230
June 30, 2005	6,498,556	3,958,939	60.9%	2,539,617
June 30, 2006	7,229,851	4,141,700	57.3%	3,088,151
June 30, 2007	7,189,403	4,424,399	61.5%	2,765,004
June 30, 2008	7,619,178	4,936,976	64.8%	2,682,202
June 30, 2009	7,847,514	4,472,958	57.0%	3,374,556
June 30, 2010	8,847,788	4,739,128	53.6%	4,108,660
June 30, 2011	9,128,795	4,937,937	54.1%	4,190,858
June 30, 2012	9,346,444	4,869,154	52.1%	4,477,290
June 30, 2013	9,592,107	4,974,076	51.9%	4,618,031
June 30, 2014	9,841,032	6,019,274	61.2%	3,821,758
June 30, 2015	9,729,117	8,108,923	83.3%	1,620,194
June 30, 2016	9,907,624	8,200,391	82.8%	1,707,233
June 30, 2017	10,144,618	8,313,637	82.0%	1,830,981
June 30, 2018	9,960,440	8,440,309	84.7%	1,520,131
June 30, 2019	9,906,664	8,511,493	85.9%	1,395,171
June 30, 2020	9,936,711	8,608,347	86.6%	1,328,364

Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets (\$'s in 000's)

As of June 30, 2020	Pension	Healthcare	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	\$ 55,802	\$ 28,691	\$ 84,493	1.0%
- Subtotal	\$ 55,802	\$ 28,691	\$ 84,493	1.0%
Fixed Income Investments				
- Domestic Fixed Income Pool	\$ 1,178,804	\$ 642,460	\$ 1,821,264	21.6%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	\$ 1,178,804	\$ 642,460	\$ 1,821,264	21.6%
Equity Investments				
- Domestic Equity Pool	\$ 1,484,807	\$ 809,287	\$ 2,294,094	27.3%
- International Equity Pool	847,228	461,777	1,309,005	15.6%
- Private Equity Pool	671,858	366,193	1,038,051	12.3%
- Emerging Markets Equity Pool	177,165	96,563	273,728	3.3%
- Alternative Equity Strategies	295,547	161,087	456,634	5.4%
- Subtotal	\$ 3,476,605	\$ 1,894,907	\$ 5,371,512	63.9%
Other Investments				
- Real Estate Pool	\$ 334,427	\$ 182,651	\$ 517,078	6.1%
- Other Investments Pool	400,371	218,220	618,591	7.4%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	318	318	0.0%
- Subtotal	\$ 734,798	\$ 401,189	\$ 1,135,987	13.5%
Total Cash and Investments	\$ 5,446,009	\$ 2,967,247	\$ 8,413,256	100.0%
Net Accrued Receivables	(1,210)	(13,786)	(14,996)	
Net Assets	\$ 5,444,799	\$ 2,953,461	\$ 8,398,260	

Section 2.2: Changes in Fair Value of Assets During FY20 (\$'s in 000's)

Fiscal Year 2020	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2019	\$ 5,511,929	\$ 2,929,319	\$ 8,441,248
2. Additions:			
a. Employee Contributions	\$ 33,566	\$ 0	\$ 33,566
b. Employer Contributions	33,204	18,788	51,992
c. State Assistance Contributions	141,129	0	141,129
d. Interest and Dividend Income	83,965	44,835	128,800
e. Net Appreciation / Depreciation in Fair Value of Investments	150,651	83,644	234,295
f. Employer Group Waiver Plan	0	11,705	11,705
g. Other	33	258	291
h. Total Additions	\$ 442,548	\$ 159,230	\$ 601,778
3. Deductions:			
a. Medical Benefits	\$ 0	\$ 125,310	\$ 125,310
b. Retirement Benefits	488,748	0	488,748
c. Refund of Contributions	1,699	0	1,699
d. Investment Expenses	16,243	8,406	24,649
e. Administrative Expenses	2,988	1,372	4,360
f. Total Deductions	\$ 509,678	\$ 135,088	\$ 644,766
4. Fair Value of Assets as of June 30, 2020	\$ 5,444,799	\$ 2,953,461	\$ 8,398,260
5. Approximate Fair Value Investment Return Rate during FY20 Net of Investment Expenses	4.1%	4.2%	4.1%

Section 2.3: Development of Actuarial Value of Assets (\$'s in 000's)

The actuarial value of asset was set equal to the fair value as of June 30, 2014 and the 20% corridor was eliminated. Investment gains and losses after June 30, 2014 are recognized 20% per year over 5 years.

	Pension	Healthcare	Total
1. Deferral of Investment Gain / (Loss) for FY20			
a. Fair Value of Assets as of June 30, 2019	\$ 5,511,929	\$ 2,929,319	\$ 8,441,248
b. Contributions	207,899	18,788	226,687
c. Employer Group Waiver Plan	0	11,705	11,705
d. Benefit Payments	490,447	125,310	615,757
e. Administrative Expenses	2,988	1,372	4,360
f. Actual Investment Return (net of investment expenses)	218,406	120,331	338,737
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return, Weighted for Timing	400,222	212,698	612,920
i. Investment Gain / (Loss) for the Year, (f) - (h)	(181,816)	(92,367)	(274,183)
2. Actuarial Value as of June 30, 2020			
a. Fair Value as of June 30, 2020	\$ 5,444,799	\$ 2,953,461	\$ 8,398,260
b. Deferred Investment Gain / (Loss)	(142,265)	(67,822)	(210,087)
c. Actuarial Value as of June 30, 2020, (a) - (b)	5,587,064	3,021,283	8,608,347
3. Ratio of Actuarial Value of Assets to Fair Value of Assets			
	102.6%	102.3%	102.5%
4. Approximate Actuarial Value Investment Return Rate during FY20 Net of Investment Expenses			
	5.7%	5.9%	5.8%

The tables below show the development of the gains/(losses) to be recognized in the current year (\$'s in 000's):

Pension				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (443,393)	\$ (354,716)	\$ (88,677)	\$ 0
June 30, 2017	236,679	142,008	47,336	47,335
June 30, 2018	13,001	5,200	2,600	5,201
June 30, 2019	(82,246)	(16,449)	(16,449)	(49,348)
June 30, 2020	<u>(181,816)</u>	<u>0</u>	<u>(36,363)</u>	<u>(145,453)</u>
Total	\$ (457,775)	\$ (223,957)	\$ (91,553)	\$ (142,265)

Healthcare				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (218,931)	\$ (175,144)	\$ (43,787)	\$ 0
June 30, 2017	126,053	75,633	25,210	25,210
June 30, 2018	9,619	3,848	1,924	3,847
June 30, 2019	(38,309)	(7,662)	(7,662)	(22,985)
June 30, 2020	<u>(92,367)</u>	<u>0</u>	<u>(18,473)</u>	<u>(73,894)</u>
Total	\$ (213,935)	\$ (103,325)	\$ (42,788)	\$ (67,822)

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (662,324)	\$ (529,860)	\$ (132,464)	\$ 0
June 30, 2017	362,732	217,641	72,546	72,545
June 30, 2018	22,620	9,048	4,524	9,048
June 30, 2019	(120,555)	(24,111)	(24,111)	(72,333)
June 30, 2020	<u>(274,183)</u>	<u>0</u>	<u>(54,836)</u>	<u>(219,347)</u>
Total	\$ (671,710)	\$ (327,282)	\$ (134,341)	\$ (210,087)

Section 2.4: Historical Asset Rates of Return

Year Ending	Actuarial Value		Fair Value	
	Annual	Cumulative*	Annual	Cumulative*
June 30, 2005	9.1%	9.1%	8.5%	8.5%
June 30, 2006	9.6%	9.3%	11.4%	9.9%
June 30, 2007	11.9%	10.2%	18.5%	12.7%
June 30, 2008	10.2%	10.2%	(3.0%)	8.6%
June 30, 2009	(7.9%)	6.3%	(21.0%)	1.9%
June 30, 2010	8.1%	6.6%	10.6%	3.3%
June 30, 2011	6.9%	6.6%	20.5%	5.6%
June 30, 2012	0.7%	5.9%	0.2%	4.9%
June 30, 2013	3.7%	5.6%	12.2%	5.7%
June 30, 2014	22.7%	7.2%	18.2%	6.9%
June 30, 2015	7.2%	7.2%	3.2%	6.5%
June 30, 2016	5.1%	7.1%	(0.7%)	5.9%
June 30, 2017	5.6%	6.9%	12.9%	6.4%
June 30, 2018	6.2%	6.9%	8.2%	6.6%
June 30, 2019	5.5%	6.8%	5.9%	6.5%
June 30, 2020	5.8%	6.7%	4.1%	6.4%

* Cumulative since fiscal year ending June 30, 2005

Section 3: Projections

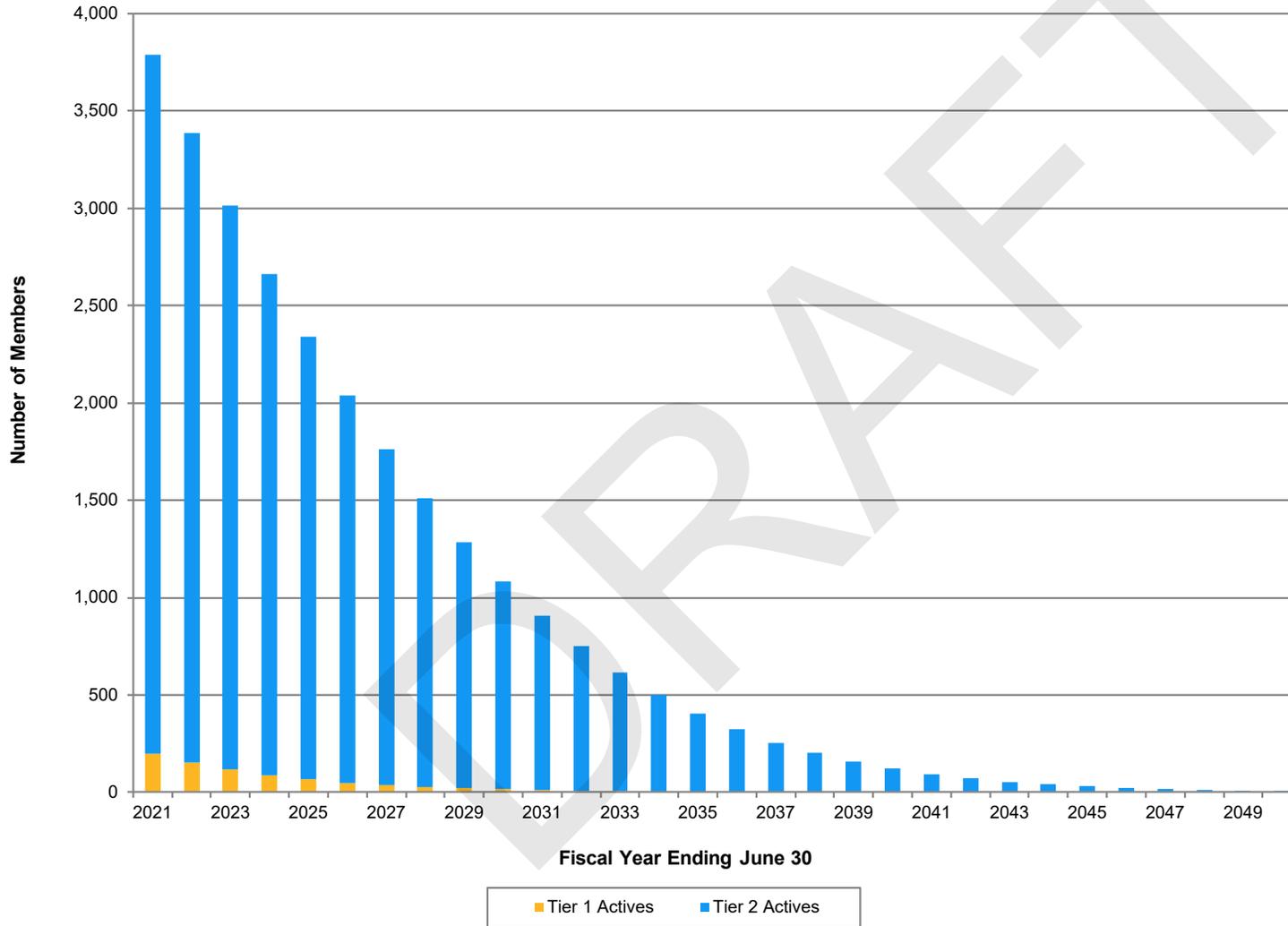
Section 3.1: Projection Assumptions and Methods

Key Assumptions

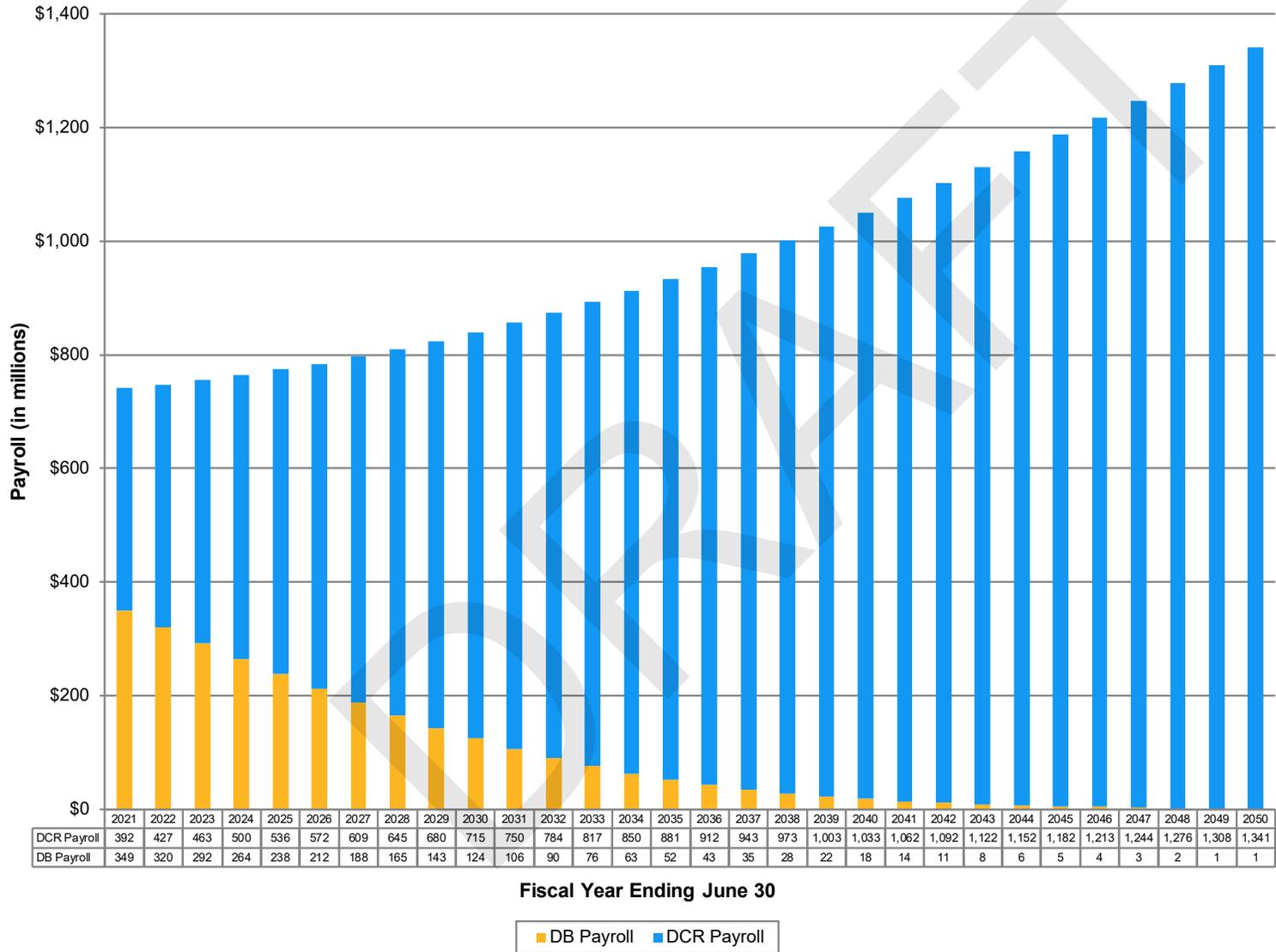
- 7.38% investment return (net of investment expenses) on the Fair Value of Assets in all future years.
- The Actuarial Value of Assets was re-initialized to Fair Value as of June 30, 2014. The Actuarial Value of Assets after June 30, 2014 reflects the deferred gains and losses generated by the smoothing method. The current deferred amount is recognized in the first four years of the projections.
- Actuarial assumptions and methods as described in Section 5. No actuarial gains/losses are assumed after June 30, 2020.
- The actuarially calculated contribution rate using a two-year roll-forward approach is adopted each year.
- Projections assume a 0% increase in the total active member population. All new members are expected to enter the DCR plan.
- Contribution rates are determined as a percent of total DB and DCR payroll.
- The DCR contribution rate determined as of June 30, 2020 is assumed to remain constant in all future years.
- The active rehire assumption shown in Section 5 is assumed to grade to zero on a uniform basis over 20 years.
- The Normal Cost is increased by the administrative expenses shown in Section 5. For future years, the percent increase is assumed to remain constant.

Section 3.2: Membership Projection

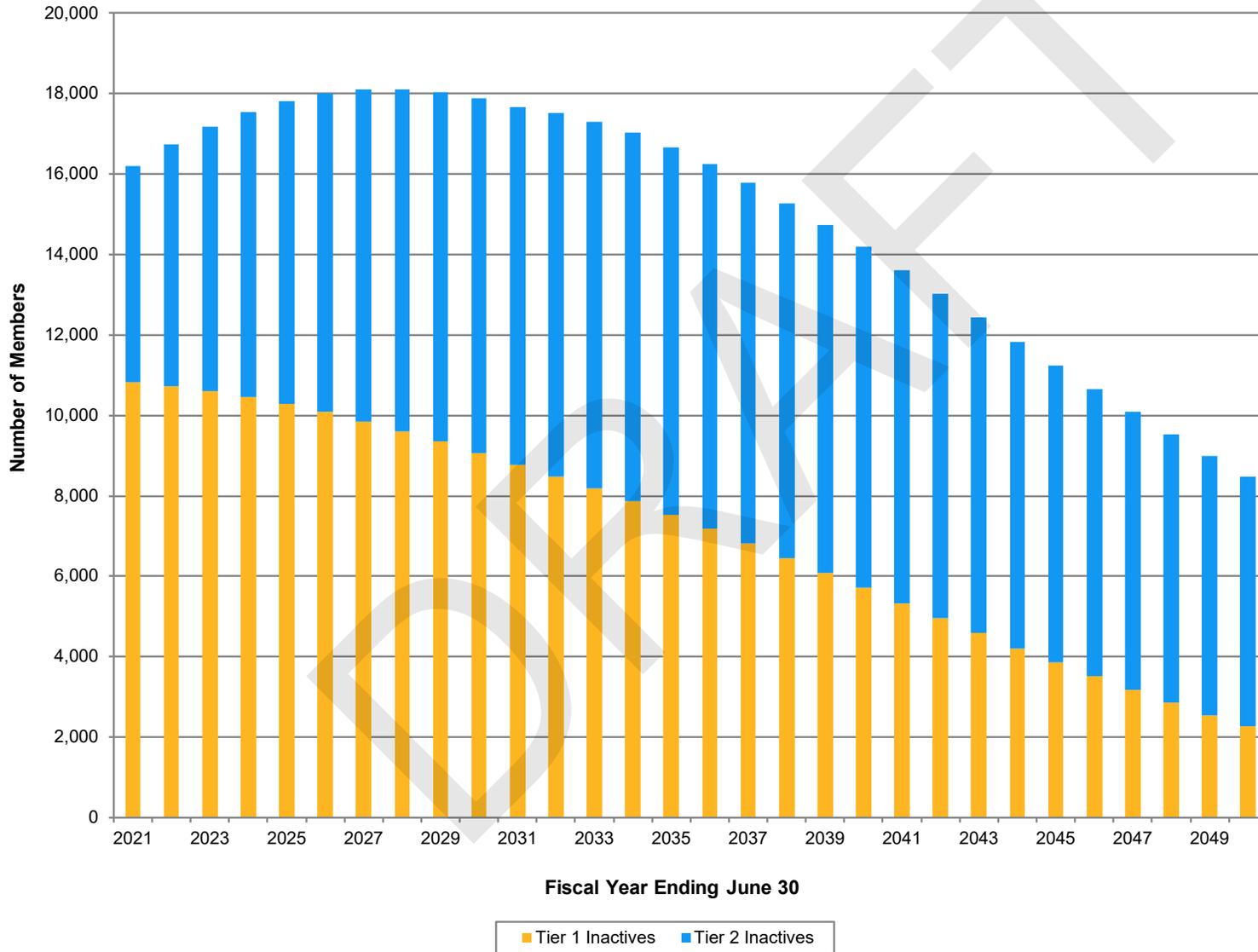
Projected Active Member Count



Projected DB and DCR Payroll

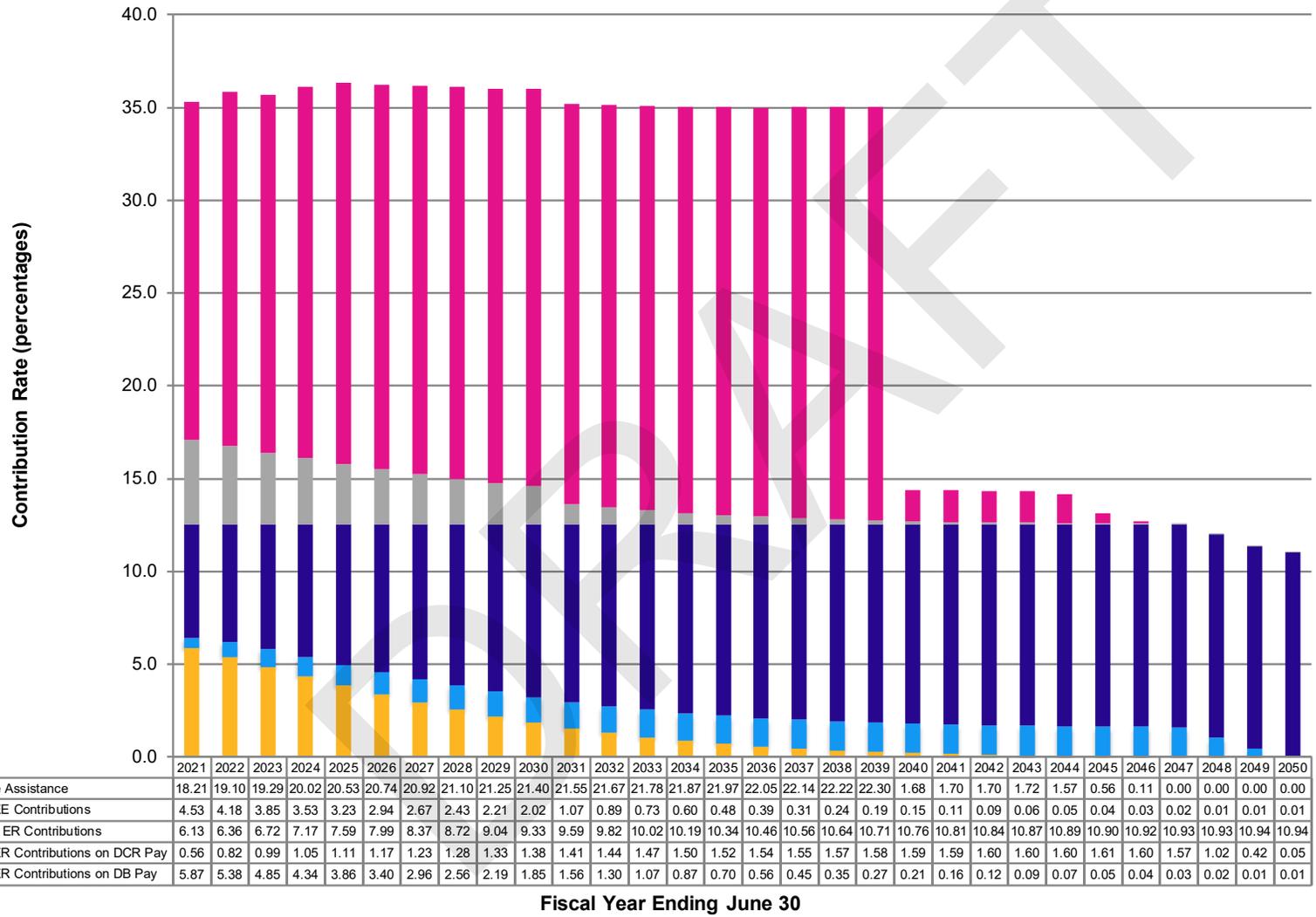


Projected Inactive Member Count



Section 3.3: Projected Employer/State Contribution Rates

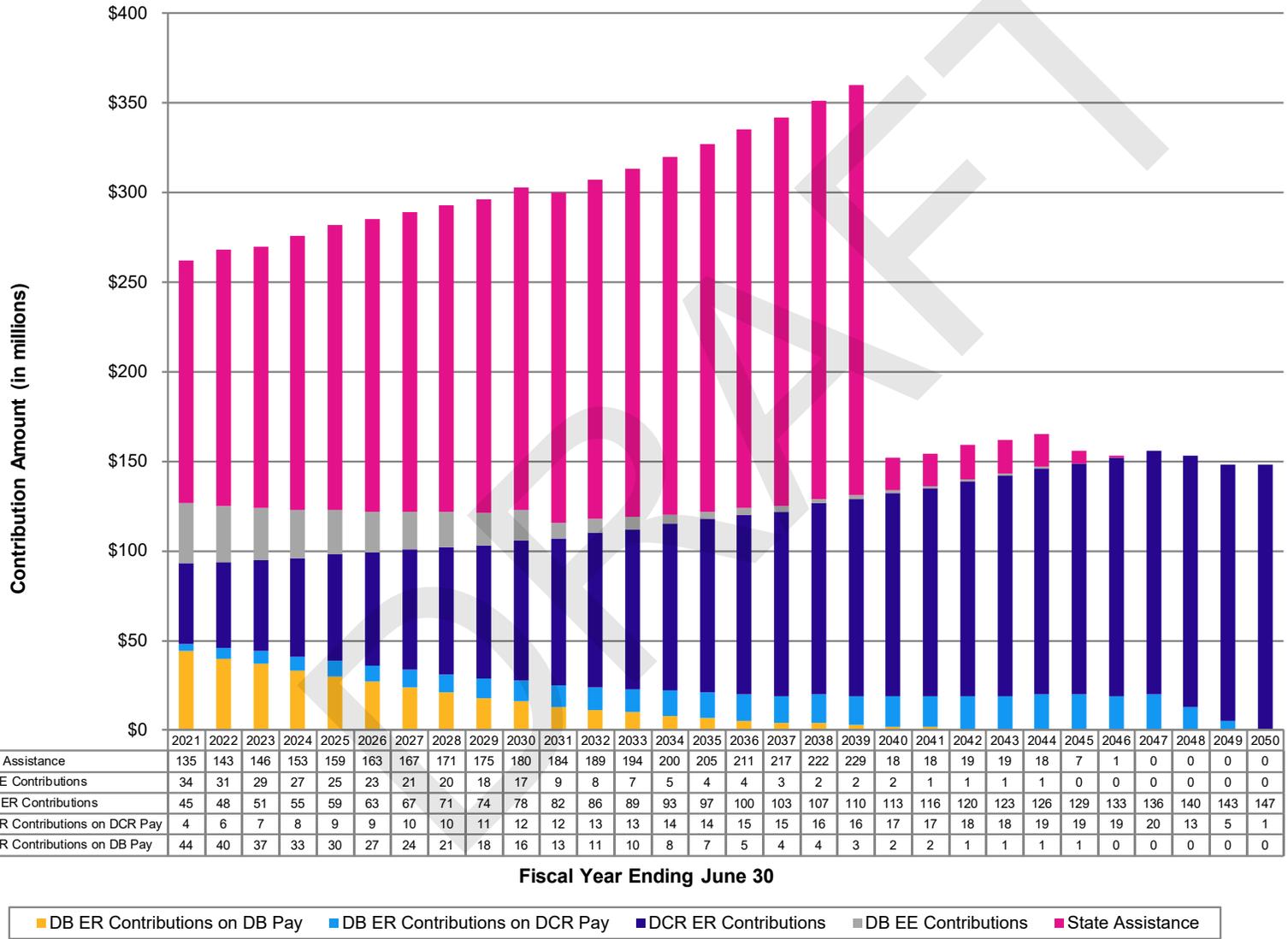
Based on Total DB and DCR Payroll



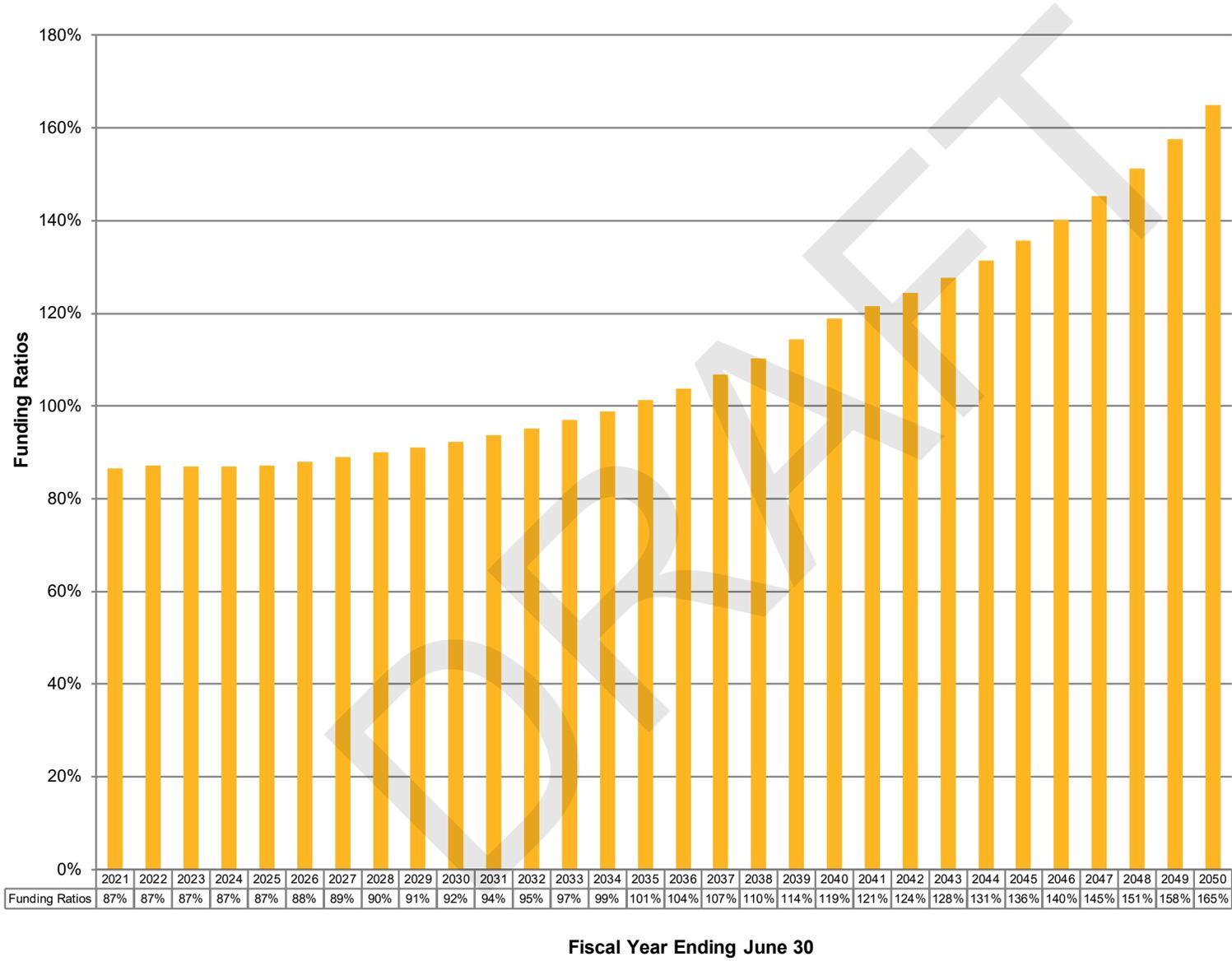
Fiscal Year Ending June 30

■ DB ER Contributions on DB Pay
 ■ DB ER Contributions on DCR Pay
 ■ DCR ER Contributions
 ■ DB EE Contributions
 ■ State Assistance

Section 3.4: Projected Employer/State Contribution Amounts



Section 3.5: Projection of Funded Ratios



Section 3.6: Table of Projected Actuarial Results (\$'s in 000's)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)				Cash Flow Amounts during Following 12 Months								Deferred Asset Gain / (Loss)	
	Actuarial Assets	Accrued Liability	Funding Ratio	Unfunded Liability / (Surplus)	Total Salaries	Contribution Rates			DB Contributions					Benefit Payments
						Employer / State	DCR	Total	Employer	State Assistance	Employee	Total		
2021	\$ 8,608,347	\$ 9,936,711	86.6%	\$ 1,328,364	\$ 741,090	24.64%	6.13%	30.77%	\$ 47,652	\$ 134,976	\$ 33,592	\$ 216,220	\$ 646,037	\$ (208,208)
2022	8,779,831	10,075,741	87.1%	1,295,910	747,110	25.30%	6.36%	31.66%	46,321	142,665	31,234	220,220	670,949	(133,785)
2023	8,870,505	10,192,318	87.0%	1,321,813	754,801	25.13%	6.72%	31.85%	44,081	145,601	29,053	218,735	695,571	(54,836)
2024	8,942,204	10,285,931	86.9%	1,343,727	763,529	25.41%	7.17%	32.58%	41,154	152,859	26,942	220,955	719,738	0
2025	9,026,969	10,355,543	87.2%	1,328,574	773,564	25.50%	7.59%	33.09%	38,446	158,813	24,976	222,235	743,225	0
2026	9,154,375	10,400,684	88.0%	1,246,309	784,447	25.31%	7.99%	33.30%	35,849	162,694	23,063	221,606	765,802	0
2027	9,267,565	10,420,496	88.9%	1,152,931	796,246	25.11%	8.37%	33.48%	33,363	166,575	21,280	221,218	786,528	0
2028	9,367,651	10,415,007	89.9%	1,047,356	809,317	24.94%	8.72%	33.66%	31,078	170,766	19,633	221,477	807,659	0
2029	9,453,909	10,383,059	91.1%	929,150	823,680	24.77%	9.04%	33.81%	28,994	175,032	18,205	222,231	828,000	0
2030	9,526,639	10,323,558	92.3%	796,919	839,114	24.63%	9.33%	33.96%	27,104	179,570	16,911	223,585	845,827	0
2031	9,588,062	10,237,634	93.7%	649,572	855,678	24.52%	9.59%	34.11%	25,414	184,399	9,156	218,969	855,379	0
2032	9,639,746	10,126,104	95.2%	486,358	873,703	24.41%	9.82%	34.23%	23,940	189,331	7,776	221,047	868,879	0
2033	9,683,787	9,989,195	96.9%	305,408	892,690	24.32%	10.02%	34.34%	22,674	194,428	6,517	223,619	880,356	0
2034	9,722,219	9,827,327	98.9%	105,108	912,623	24.24%	10.19%	34.43%	21,629	199,591	5,476	226,696	887,930	0
2035	9,759,186	9,642,988	101.2%	(116,198)	933,432	24.19%	10.34%	34.53%	20,722	205,075	4,480	230,277	891,475	0
2036	9,799,269	9,439,034	103.8%	(360,235)	955,229	24.15%	10.46%	34.61%	20,060	210,628	3,725	234,413	892,002	0
2037	9,846,391	9,217,513	106.8%	(628,878)	977,938	24.14%	10.56%	34.70%	19,559	216,515	3,032	239,106	889,967	0
2038	9,904,304	8,980,095	110.3%	(924,209)	1,001,236	24.14%	10.64%	34.78%	19,223	222,475	2,403	244,101	884,543	0
2039	9,977,621	8,729,379	114.3%	(1,248,242)	1,025,467	24.15%	10.71%	34.86%	18,971	228,679	1,948	249,598	877,047	0
2040	10,070,146	8,466,760	118.9%	(1,603,386)	1,050,536	3.48%	10.76%	14.24%	18,910	17,649	1,576	38,135	868,022	0
2041	9,951,890	8,193,155	121.5%	(1,758,735)	1,076,449	3.45%	10.81%	14.26%	18,838	18,300	1,184	38,322	854,528	0
2042	9,839,195	7,912,579	124.3%	(1,926,616)	1,103,194	3.42%	10.84%	14.26%	18,975	18,754	993	38,722	838,425	0
2043	9,735,384	7,627,387	127.6%	(2,107,997)	1,130,493	3.41%	10.87%	14.28%	19,105	19,444	678	39,227	817,877	0
2044	9,645,832	7,341,960	131.4%	(2,303,872)	1,158,574	3.24%	10.89%	14.13%	19,348	18,190	579	38,117	795,721	0
2045	9,571,508	7,058,062	135.6%	(2,513,446)	1,187,306	2.22%	10.90%	13.12%	19,709	6,649	475	26,833	771,176	0
2046	9,505,081	6,778,372	140.2%	(2,726,709)	1,216,772	1.75%	10.92%	12.67%	19,955	1,338	365	21,658	747,071	0
2047	9,453,239	6,502,821	145.4%	(2,950,418)	1,246,928	1.60%	10.93%	12.53%	19,950	0	249	20,199	722,987	0
2048	9,421,036	6,231,752	151.2%	(3,189,284)	1,277,634	1.04%	10.93%	11.97%	13,288	0	128	13,416	700,041	0
2049	9,403,275	5,964,366	157.7%	(3,438,909)	1,309,219	0.43%	10.94%	11.37%	5,630	0	131	5,761	677,034	0
2050	9,400,178	5,701,037	164.9%	(3,699,141)	1,341,582	0.06%	10.94%	11.00%	805	0	134	939	654,179	0
Total									\$ 740,747	\$ 3,540,996	\$ 295,894	\$ 4,577,637		

The FY21 and FY22 Employer/State contribution rates shown above differ from those shown in Section 1.6 because they are adjusted for total salaries.

Section 3.6: Table of Projected Actuarial Results (\$'s in 000's) (continued)

Fiscal Year End	Valuation Amounts on July 1 (Beginning of FY)					
	Funding Ratio			Unfunded Liability / (Surplus)		
	Pension	Healthcare	Total	Pension	Healthcare	Total
2021	75.0%	121.4%	86.6%	\$ 1,859,972	\$ (531,608)	\$ 1,328,364
2022	75.2%	122.1%	87.1%	1,862,683	(566,773)	1,295,910
2023	74.9%	122.0%	87.0%	1,900,135	(578,322)	1,321,813
2024	74.5%	122.2%	86.9%	1,939,040	(595,313)	1,343,727
2025	74.4%	122.6%	87.2%	1,948,739	(620,165)	1,328,574
2026	74.9%	123.9%	88.0%	1,912,850	(666,541)	1,246,309
2027	75.4%	125.3%	88.9%	1,869,425	(716,494)	1,152,931
2028	75.9%	126.8%	89.9%	1,817,840	(770,484)	1,047,356
2029	76.5%	128.5%	91.1%	1,757,393	(828,243)	929,150
2030	77.2%	130.4%	92.3%	1,687,324	(890,405)	796,919
2031	78.0%	132.6%	93.7%	1,606,772	(957,200)	649,572
2032	78.9%	135.0%	95.2%	1,514,666	(1,028,308)	486,358
2033	80.0%	137.6%	96.9%	1,409,757	(1,104,349)	305,408
2034	81.3%	140.6%	98.9%	1,290,885	(1,185,777)	105,108
2035	82.9%	144.0%	101.2%	1,156,997	(1,273,195)	(116,198)
2036	84.7%	147.8%	103.8%	1,006,797	(1,367,032)	(360,235)
2037	86.9%	152.0%	106.8%	838,914	(1,467,792)	(628,878)
2038	89.5%	156.8%	110.3%	651,848	(1,576,057)	(924,209)
2039	92.6%	162.1%	114.3%	444,021	(1,692,263)	(1,248,242)
2040	96.3%	168.1%	118.9%	213,723	(1,817,109)	(1,603,386)
2041	96.6%	174.9%	121.5%	192,406	(1,951,141)	(1,758,735)
2042	96.9%	182.5%	124.3%	168,433	(2,095,049)	(1,926,616)
2043	97.3%	191.1%	127.6%	141,613	(2,249,610)	(2,107,997)
2044	97.7%	200.6%	131.4%	111,684	(2,415,556)	(2,303,872)
2045	98.3%	211.1%	135.6%	80,348	(2,593,794)	(2,513,446)
2046	98.7%	222.7%	140.2%	58,488	(2,785,197)	(2,726,709)
2047	99.1%	235.5%	145.4%	40,285	(2,990,703)	(2,950,418)
2048	99.5%	249.7%	151.2%	22,170	(3,211,454)	(3,189,284)
2049	99.8%	265.7%	157.7%	9,521	(3,448,430)	(3,438,909)
2050	99.9%	283.5%	164.9%	3,801	(3,702,942)	(3,699,141)

Section 3.7: Projected Pension Benefit Recipients and Amounts (\$'s in 000's)

Fiscal Year End	Pension		Fiscal Year End	Pension	
	Recipient Counts	Benefit Amounts		Recipient Counts	Benefit Amounts
2021	13,689	\$ 513,035	2060	3,590	\$ 254,876
2022	14,250	531,408	2061	3,283	237,386
2023	14,749	549,041	2062	2,993	220,316
2024	15,196	565,575	2063	2,718	203,691
2025	15,576	581,240	2064	2,460	187,533
2026	15,889	595,794	2065	2,217	171,870
2027	16,138	609,418	2066	1,989	156,745
2028	16,317	621,862	2067	1,774	142,188
2029	16,425	632,713	2068	1,575	128,236
2030	16,449	641,870	2069	1,389	114,927
2031	16,411	642,603	2070	1,218	102,301
2032	16,280	647,688	2071	1,060	90,402
2033	16,090	650,746	2072	916	79,267
2034	15,826	651,691	2073	785	68,927
2035	15,492	650,489	2074	667	59,408
2036	15,094	647,316	2075	561	50,720
2037	14,665	642,181	2076	467	42,864
2038	14,173	635,419	2077	386	35,831
2039	13,672	626,629	2078	314	29,602
2040	13,153	616,155	2079	253	24,150
2041	12,603	604,106	2080	202	19,440
2042	12,043	590,528	2081	158	15,430
2043	11,468	575,528	2082	123	12,065
2044	10,889	559,397	2083	94	9,287
2045	10,316	542,226	2084	70	7,033
2046	9,754	524,227	2085	52	5,235
2047	9,205	505,557	2086	38	3,828
2048	8,673	486,343	2087	27	2,748
2049	8,158	466,729	2088	19	1,936
2050	7,659	446,876	2089	13	1,339
2051	7,172	426,921	2090	9	909
2052	6,701	406,961	2091	6	606
2053	6,248	387,083	2092	4	397
2054	5,812	367,357	2093	2	257
2055	5,395	347,845	2094	2	164
2056	4,997	328,594	2095	1	104
2057	4,617	309,645	2096	1	66
2058	4,257	291,026	2097	1	42
2059	3,914	272,763	2098	0	0

Counts include retirees, disability recipients, and beneficiaries.

Section 4: Member Data

Section 4.1: Summary of Members Included

As of June 30	2016	2017	2018	2019	2020
Active Members					
1. Number	5,123	4,772	4,418	4,044	3,789 ¹
2. Average Age	50.50	50.86	51.13	51.48	51.92
3. Average Credited Service	17.53	18.12	18.62	19.21	19.76
4. Average Entry Age	32.97	32.74	32.51	32.27	32.16
5. Average Annual Earnings	\$ 84,954	\$ 86,327	\$ 87,374	\$ 88,879	\$ 90,564
6. Number Vested	4,966	4,772	4,418	4,044	3,789
7. Percent Who Are Vested	96.9%	100.0%	100.0%	100.0%	100.0%
Retirees, Disabilitants, and Beneficiaries					
1. Number	12,726	12,983	13,277	13,491	13,689
2. Average Age	69.85	70.36	70.78	71.30	71.85
3. Average Years Since Retirement	13.78	14.13	14.40	14.74	15.06
4. Average Monthly Pension Benefit					
a. Base	\$ 2,204	\$ 2,228	\$ 2,273	\$ 2,303	\$ 2,330
b. COLA ²	128	128	128	126	126
c. PRPA ²	529	506	488	518	519
d. Adjustment	0	0	0	0	0
e. Sick	60	62	65	67	68
f. Total	\$ 2,921	\$ 2,924	\$ 2,954	\$ 3,014	\$ 3,043
Vested Terminations (vested at termination, not refunded contributions, or commenced benefit)					
1. Number	875	876	797	812	764
2. Average Age	50.25	50.82	51.01	51.71	52.37
3. Average Monthly Pension Benefit	\$ 1,352	\$ 1,441	\$ 1,350	\$ 1,534	\$ 1,579
Non-Vested Terminations (not vested at termination, not refunded contributions)					
1. Number	2,103	1,994	1,900	1,810	1,744
2. Average Account Balance	\$ 19,728	\$ 20,290	\$ 20,872	\$ 21,612	\$ 22,591
Total Number of Members	20,827	20,625	20,392	20,157	19,986

¹ Includes 1,200 male active members and 2,589 female active members.

² Calculated by taking the average of the data field, as provided by the State of Alaska, for all participants in the group.

Summary of Members Included

As of June 30, 2020	DB			DCR Tier 3	Grand Total
	Tier 1	Tier 2	Total		
Active Members					
1. Number	198	3,591	3,789	5,332	9,121
2. Average Age	62.38	51.34	51.92	41.63	45.90
3. Average Credited Service	29.43	19.23	19.76	6.03	11.73
4. Average Entry Age	32.95	32.11	32.16	35.60	34.17
5. Annual Earnings					
a. Total	\$ 19,818,370	\$ 323,327,508	\$ 343,145,878	\$ 379,200,791	\$ 722,346,669
b. Average	\$ 100,093	\$ 90,038	\$ 90,564	\$ 71,118	\$ 79,196

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

As of June 30, 2020	Tier 1	Tier 2	Total
Retirees, Disabilitants, and Beneficiaries			
1. Number	10,542	3,147	13,689
2. Average Age	73.60	65.99	71.85
3. Average Years Since Retirement	17.79	5.93	15.06
4. Average Monthly Pension Benefit			
a. Base	\$ 2,361	\$ 2,226	\$ 2,330
b. COLA	147	54	126
c. PRPA	648	87	519
d. Adjustment	0	0	0
e. Sick	68	69	68
f. Total	\$ 3,224	\$ 2,436	\$ 3,043

Summary of Members Included

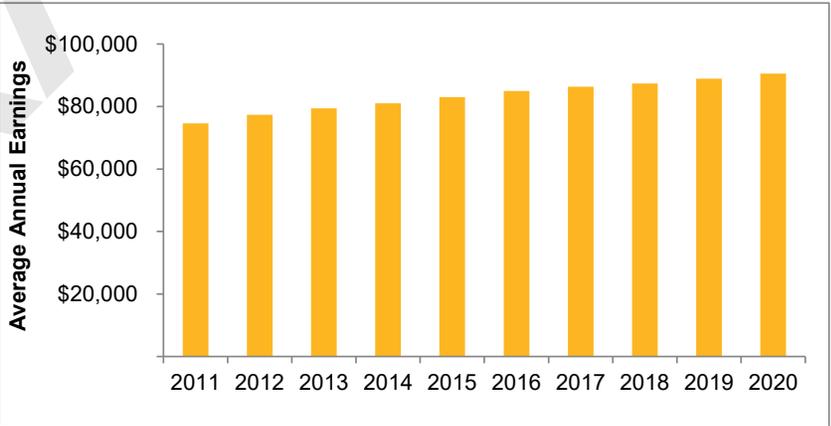
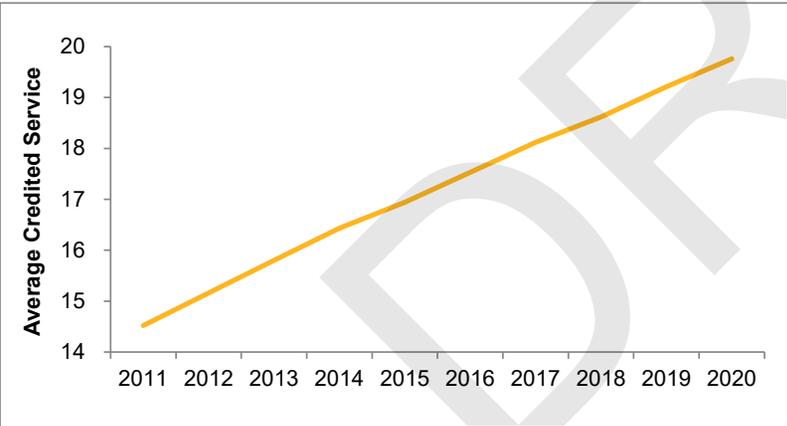
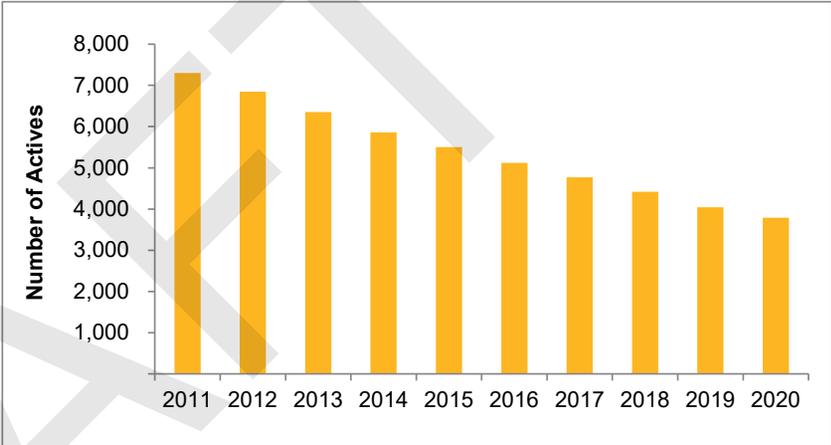
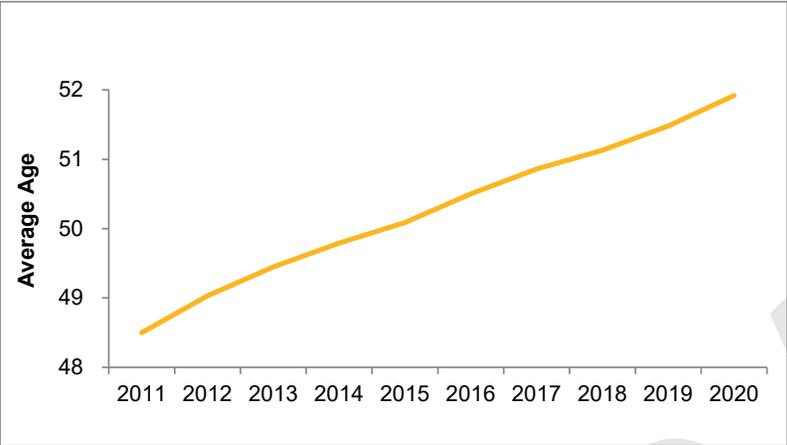
As of June 30, 2020	Active Members	Inactive Members				Total Inactive Members
		Retirees	Covered Spouses	Covered Children / Dependents	Deferred	
Retiree Medical Participants						
1. Retiree Coverage Only	3,746	7,602	0	0	361	7,963
2. Retiree + Spouse	0	3,885	3,885	0	591	8,361
3. Retiree + Children / Dependents	0	197	0	176	0	373
4. Family	0	335	335	493	0	1,163
5. Total	3,746	12,019	4,220	669	952	17,860

As of June 30, 2020	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	Total Inactive Members
Retiree Medical Participants					
1. Pre-Medicare	2,359	1,323	669	941	5,292
2. Medicare Part A & B	9,458	2,871	0	11	12,340
3. Medicare Part B Only	202	26	0	0	228
4. Total	12,019	4,220	669	952	17,860

As of June 30, 2020	Retirees
Summary of Retiree Medical Data Received	
1. Retiree records on pension data	13,689
2. Remove duplicates on pension data	(497)
3. Valued in a different retiree healthcare plan ¹	(806)
4. Records without medical coverage	(428)
5. Medical only retirees	61
6. Total	12,019

¹ Each member's retiree medical benefits are valued in the plan indicated in the data from Aetna

Summary of Members Included - Active Members at June 30



Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 4.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	108	8,814,458	81,615
40 - 44	620	53,157,156	85,737
45 - 49	946	84,739,069	89,576
50 - 54	914	84,313,377	92,247
55 - 59	664	60,808,948	91,580
60 - 64	336	31,398,776	93,449
65 - 69	129	12,398,268	96,111
70 - 74	58	6,101,808	105,204
75+	14	1,414,018	101,001

Total 3,789 \$343,145,878 \$ 90,564

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	1	\$ 114,364	\$ 114,364
1	0	0	0
2	5	299,217	59,843
3	11	697,617	63,420
4	9	615,877	68,431
0 - 4	26	\$ 1,727,075	\$ 66,426
5 - 9	107	7,872,695	73,577
10 - 14	408	33,442,468	81,967
15 - 19	1,429	126,346,957	88,416
20 - 24	1,226	114,657,353	93,521
25 - 29	436	42,742,931	98,034
30 - 34	115	11,417,158	99,280
35 - 39	29	2,995,562	103,295
40+	13	1,943,679	149,514

Total 3,789 \$343,145,878 \$ 90,564

Years of Credited Service by Age

Age	Years of Service										Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+		
0 - 19	0	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0	0
35 - 39	0	6	41	60	1	0	0	0	0	0	108
40 - 44	7	39	123	389	62	0	0	0	0	0	620
45 - 49	6	30	106	378	397	29	0	0	0	0	946
50 - 54	7	17	53	278	386	159	14	0	0	0	914
55 - 59	3	10	45	182	231	142	46	5	0	0	664
60 - 64	3	4	20	89	106	72	29	13	0	0	336
65 - 69	0	1	14	35	29	25	18	5	2	0	129
70 - 74	0	0	4	15	11	8	7	6	7	0	58
75+	0	0	2	3	3	1	1	0	4	0	14

Total 26 107 408 1,429 1,226 436 115 29 13 3,789

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 4.3: Member Data Reconciliation

Pension

	Inactive Members						Total
	Active Members	Due a Refund	Deferred Benefits	Retired Members	Disabled Members	Bene-ficiaries	
As of June 30, 2019	4,044	1,810	812	12,147	26	1,318	20,157
Vested Terminations	(120)	0	120	0	0	0	0
Non-Vested Terminations	(7)	7	0	0	0	0	0
Refund of Contributions	(2)	(46)	(2)	0	0	0	(50)
Disability Retirements	(1)	0	(1)	0	2	0	0
Age Retirements	(233)	(5)	(82)	328	(8)	0	0
Deaths With Beneficiary	(2)	(2)	(1)	(105)	0	110	0
Deaths Without Beneficiary	(1)	0	(2)	(101)	0	(42)	(146)
Data Corrections	1	4	0	1	0	(1)	5
Transfers In/Out	0	0	0	0	0	0	0
Rehires	110	(24)	(80)	(6)	0	0	0
Pick Ups*	0	0	0	3	0	17	20
Net Change	(255)	(66)	(48)	120	(6)	84	(171)
As of June 30, 2020	3,789	1,744	764	12,267	20	1,402	19,986

* Pickup beneficiaries are primarily new DROs.

Healthcare

	Inactive Members					Total Inactive Members
	Active Members	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	
As of June 30, 2019	3,994	11,914	4,212	717	991	17,834
Vested Terminations	(74)	0	0	0	74	74
Non-Vested Terminations	(7)	0	0	0	0	0
Refund of Contributions	(2)	0	0	0	(2)	(2)
Disability Retirements	(1)	1	1	0	0	2
Age Retirements	(223)	223	106	50	0	379
Deferred Retirements	0	45	18	9	(45)	27
Retired without Medical Coverage	(36)	0	0	0	36	36
Deceased	(3)	(221)	(12)	(4)	(2)	(239)
New Beneficiaries	0	39	(39)	0	0	0
Added Retiree Medical Coverage	0	28	7	4	(28)	11
Added Dependent Coverage	0	0	39	31	0	70
Dropped Retiree Medical Coverage	0	(7)	(2)	(3)	7	(5)
Dropped Dependent Coverage	0	0	(106)	(136)	0	(242)
Rehires	105	(3)	(3)	(1)	(81)	(88)
Transfers In/Out	(7)	0	(1)	2	2	3
Net Change	(248)	105	8	(48)	(39)	26
As of June 30, 2020	3,746	12,019	4,220	669	952	17,860

Section 4.4: Schedule of Active Member Data

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2020	3,789	\$ 343,146	\$ 90,564	1.9%	56
June 30, 2019	4,044	359,426	88,879	1.7%	56
June 30, 2018	4,418	386,016	87,373	1.2%	56
June 30, 2017	4,772	411,951	86,327	1.6%	57
June 30, 2016	5,123	435,222	84,955	2.4%	57
June 30, 2015	5,502	456,636	82,995	2.4%	58
June 30, 2014	5,861	474,873	81,023	2.1%	58
June 30, 2013	6,352	504,260	79,386	2.6%	58
June 30, 2012	6,845	529,468	77,351	3.6%	58
June 30, 2011	7,303	545,155	74,648	3.5%	58

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 4.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY20 in employer list	\$ 781,137
b) DRB actual reported salaries FY20 in valuation data	710,586
c) Annualized valuation data	722,347
d) Valuation payroll as of June 30, 2020	749,522
e) Rate payroll for FY21	741,090
f) Rate payroll for FY23	754,801

- a) Actual reported salaries from DRB employer listing showing all payroll paid during FY20, including those who were not active as of June 30, 2020
- b) Payroll from valuation data for people who are in active status as of June 30, 2020
- c) Payroll from (b) annualized for both new entrants and part-timers
- d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
- e) Payroll from (d) with the part-timer annualization removed
- f) Payroll from (e) with two years of assumed decrements and salary scale, and 0% population growth

Section 4.6: Summary of New Pension Benefit Recipients

During the Year Ending June 30	2016	2017	2018	2019	2020
Service					
1. Number	422	376	465	367	331
2. Average Age at Commencement	60.32	59.77	59.98	59.87	59.71
3. Average Monthly Pension Benefit	\$ 3,190	\$ 3,300	\$ 3,527	\$ 3,562	\$ 3,693
Survivor (including surviving spouse and DROs)					
1. Number	104	108	87	96	127
2. Average Age at Commencement	72.15	70.57	71.61	74.36	74.16
3. Average Monthly Pension Benefit	\$ 1,633	\$ 1,643	\$ 2,022	\$ 1,795	\$ 1,903
Disability					
1. Number	4	3	3	5	2
2. Average Age at Commencement	50.48	43.30	49.92	51.51	53.65
3. Average Monthly Pension Benefit	\$ 3,616	\$ 3,678	\$ 3,625	\$ 4,182	\$ 3,019
Total					
1. Number	530	487	555	468	460
2. Average Age at Commencement	62.56	62.06	61.75	62.75	63.67
3. Average Monthly Pension Benefit	\$ 2,888	\$ 2,935	\$ 3,292	\$ 3,206	\$ 3,196

Summary of New Pension Benefit Recipients

Average Pension Benefit Payments

	Years of Credited Service						
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+
Period 7/1/2019 – 6/30/2020:							
Average Monthly Pension	\$ 243	\$ 1,054	\$ 1,647	\$ 2,600	\$ 3,616	\$ 4,874	\$ 6,772
Number of Recipients	8	19	26	72	90	78	40
Period 7/1/2018 – 6/30/2019:							
Average Monthly Pension	\$ 334	\$ 891	\$ 1,540	\$ 2,760	\$ 3,567	\$ 4,666	\$ 6,777
Number of Recipients	4	23	39	87	93	85	41
Period 7/1/2017 – 6/30/2018:							
Average Monthly Pension	\$ 204	\$ 899	\$ 1,583	\$ 2,583	\$ 3,422	\$ 4,580	\$ 6,083
Number of Recipients	5	21	61	85	109	130	57
Period 7/1/2016 – 6/30/2017:							
Average Monthly Pension	\$ 426	\$ 795	\$ 1,626	\$ 2,433	\$ 3,549	\$ 4,536	\$ 6,351
Number of Recipients	10	22	60	75	100	64	48
Period 7/1/2015 – 6/30/2016:							
Average Monthly Pension	\$ 245	\$ 1,002	\$ 1,535	\$ 2,540	\$ 3,445	\$ 4,472	\$ 6,168
Number of Recipients	11	31	82	69	105	74	54
Period 7/1/2014 – 6/30/2015:							
Average Monthly Pension	\$ 349	\$ 1,041	\$ 1,342	\$ 2,205	\$ 3,267	\$ 4,220	\$ 5,900
Number of Recipients	11	33	70	67	137	125	94
Period 7/1/2013 – 6/30/2014:							
Average Monthly Pension	\$ 235	\$ 904	\$ 1,435	\$ 2,398	\$ 3,016	\$ 4,073	\$ 7,485
Number of Recipients	8	31	31	28	22	18	12
Period 7/1/2012 – 6/30/2013:							
Average Monthly Pension	\$ 253	\$ 1,030	\$ 1,496	\$ 2,450	\$ 3,281	\$ 4,384	\$ 6,052
Number of Recipients	10	57	67	90	101	79	64
Period 7/1/2011 – 6/30/2012:							
Average Monthly Pension	\$ 353	\$ 1,064	\$ 1,512	\$ 2,241	\$ 3,276	\$ 4,320	\$ 5,739
Number of Recipients	11	43	62	61	118	81	58
Period 7/1/2010 – 6/30/2011:							
Average Monthly Pension	\$ 146	\$ 902	\$ 1,432	\$ 2,328	\$ 3,131	\$ 4,283	\$ 5,496
Number of Recipients	5	68	63	77	118	104	67

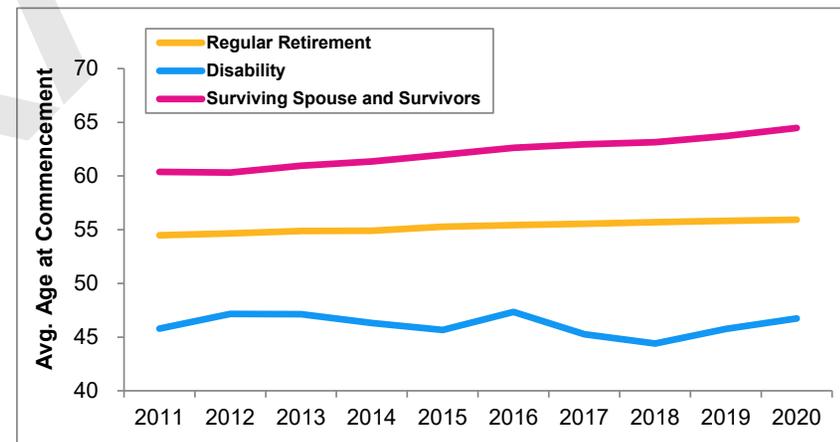
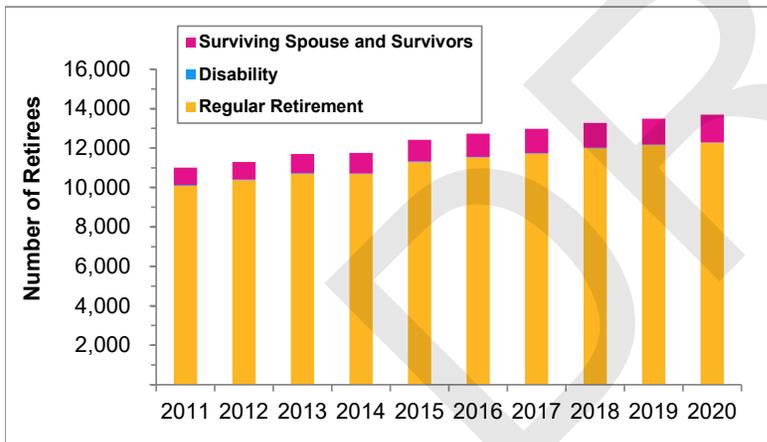
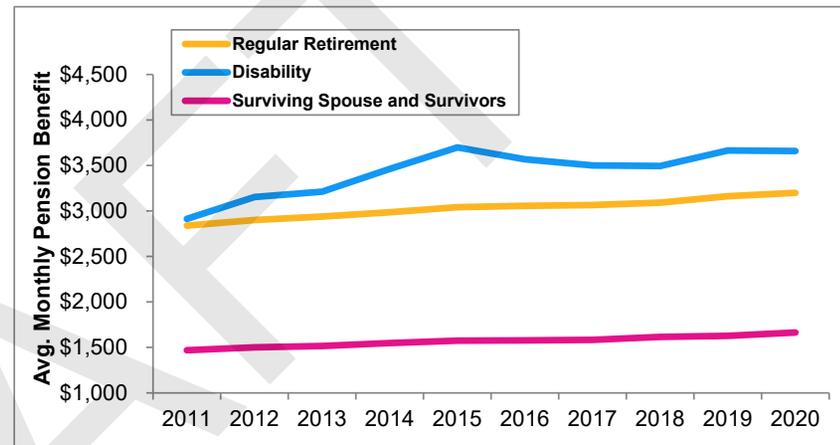
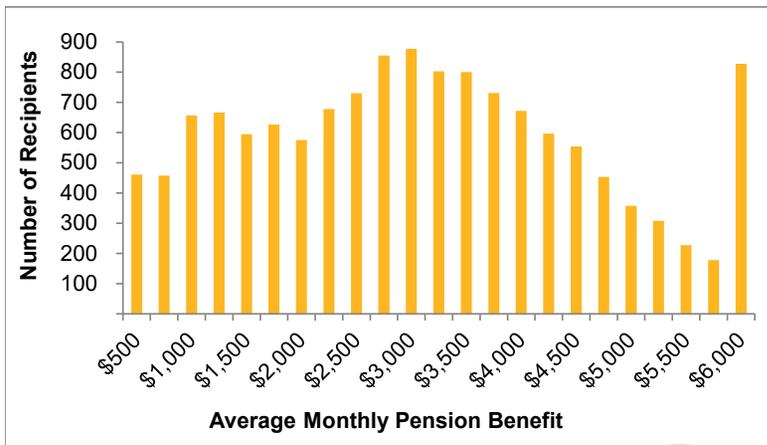
“Average Monthly Pension” includes postretirement pension adjustments and cost-of-living increases.

Beneficiaries are not included in the table above.

Section 4.7: Summary of All Pension Benefit Recipients

As of June 30	2016	2017	2018	2019	2020
Service					
1. Number, Fiscal Year Start	11,287	11,527	11,716	11,988	12,147
2. Net Change	240	189	272	159	120
3. Number, Fiscal Year End	11,527	11,716	11,988	12,147	12,267
4. Average Age at Commencement	55.43	55.55	55.70	55.82	55.93
5. Average Current Age	69.58	70.09	70.50	70.99	71.50
6. Average Monthly Pension Benefit	\$ 3,056	\$ 3,064	\$ 3,093	\$ 3,161	\$ 3,199
Surviving Spouse (including DROs)					
1. Number, Fiscal Year Start	1,096	1,168	1,237	1,261	1,315
2. Net Change	72	69	24	54	85
3. Number, Fiscal Year End	1,168	1,237	1,261	1,315	1,400
4. Average Age at Commencement	62.66	62.98	63.16	63.73	64.49
5. Average Current Age	73.07	73.42	73.90	74.65	75.26
6. Average Monthly Pension Benefit	\$ 1,580	\$ 1,584	\$ 1,618	\$ 1,629	\$ 1,665
Survivor (other than spouse)					
1. Number, Fiscal Year Start	6	3	3	3	3
2. Net Change	(3)	0	0	0	(1)
3. Number, Fiscal Year End	3	3	3	3	2
4. Average Age at Commencement	52.81	52.81	53.85	53.85	53.94
5. Average Current Age	57.22	58.22	60.65	61.65	61.56
6. Average Monthly Pension Benefit	\$ 746	\$ 746	\$ 749	\$ 765	\$ 705
Disability					
1. Number, Fiscal Year Start	29	28	27	25	26
2. Net Change	(1)	(1)	(2)	1	(6)
3. Number, Fiscal Year End	28	27	25	26	20
4. Average Age at Commencement	47.34	45.25	44.40	45.75	46.74
5. Average Current Age	51.56	50.34	50.02	51.08	51.73
6. Average Monthly Pension Benefit	\$ 3,568	\$ 3,500	\$ 3,494	\$ 3,666	\$ 3,658
Total					
1. Number, Fiscal Year Start	12,418	12,726	12,983	13,277	13,491
2. Net Change	308	257	294	214	198
3. Number, Fiscal Year End	12,726	12,983	13,277	13,491	13,689
4. Average Age at Commencement	56.07	56.24	56.38	56.56	56.79
5. Average Current Age	69.86	70.36	70.78	71.30	71.85
6. Average Monthly Pension Benefit	\$ 2,921	\$ 2,924	\$ 2,954	\$ 3,014	\$ 3,043

Summary of All Pension Benefit Recipients



Summary of All Pension Benefit Recipients

Distribution of Annual Pension Benefits for Benefit Recipients

Annual Pension Benefit by Age

Age	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40 - 44	9	299,742	33,305
45 - 49	50	1,612,221	32,244
50 - 54	271	11,563,720	42,671
55 - 59	694	28,938,378	41,698
60 - 64	1,790	64,688,013	36,139
65 - 69	2,947	101,954,915	34,596
70 - 74	3,267	114,457,481	35,034
75+	4,661	176,230,970	37,810
Total	13,689	\$499,745,440	\$ 36,507

Annual Pension Benefit by Years Since Commenced

Years Since Comm.	Number	Total Annual Pension Benefit	Average Annual Pension Benefit
0	424	\$ 16,038,365	\$ 37,826
1	474	18,545,041	39,125
2	489	19,895,682	40,686
3	489	18,221,604	37,263
4	488	18,011,169	36,908
0 - 4	2,364	\$ 90,711,861	\$ 38,372
5 - 9	2,567	96,336,262	37,529
10 - 14	2,040	65,979,522	32,343
15 - 19	2,129	68,283,318	32,073
20 - 24	2,340	86,223,222	36,848
25 - 29	926	35,961,261	38,835
30 - 34	978	42,877,347	43,842
35 - 39	247	10,143,876	41,068
40+	98	3,228,771	32,947
Total	13,689	\$499,745,440	\$ 36,507

Years Since Commencement by Age

Age	Years Since Commencement									
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0
35 - 39	0	0	0	0	0	0	0	0	0	0
40 - 44	6	2	1	0	0	0	0	0	0	9
45 - 49	45	5	0	0	0	0	0	0	0	50
50 - 54	210	48	11	0	2	0	0	0	0	271
55 - 59	391	193	85	24	1	0	0	0	0	694
60 - 64	756	551	291	146	42	3	0	0	1	1,790
65 - 69	451	996	714	482	280	23	1	0	0	2,947
70 - 74	226	504	602	918	770	173	68	4	2	3,267
75+	279	268	336	559	1,245	727	909	243	95	4,661
Total	2,364	2,567	2,040	2,129	2,340	926	978	247	98	13,689

Section 4.8: Pension Benefit Recipients by Type of Benefit and Option Elected

Amount of Monthly Pension Benefit	Number of Recipients	Type of Pension Benefit			Option Selected			
		1	2	3	1	2	3	4
\$ 1 – 300	233	159	74	0	143	45	38	7
301 – 600	394	276	118	0	213	72	86	23
601 – 900	657	505	152	0	359	132	128	38
901 – 1,200	827	656	171	0	487	162	144	34
1,201 – 1,500	727	567	160	0	393	164	148	22
1,501 – 1,800	729	562	167	0	411	157	138	23
1,801 – 2,100	743	593	150	0	387	155	174	27
2,101 – 2,400	828	704	124	0	371	203	224	30
2,401 – 2,700	990	901	89	0	438	240	279	33
2,701 – 3,000	1,053	984	66	3	444	247	329	33
3,001 – 3,300	969	921	42	6	384	229	326	30
3,301 – 3,600	938	905	31	2	386	197	330	25
3,601 – 3,900	842	823	17	2	323	177	317	25
3,901 – 4,200	739	723	13	3	290	162	267	20
4,200+	3,020	2,988	28	4	1,118	524	1,277	101
Total	13,689	12,267	1,402	20	6,147	2,866	4,205	471

Type of Pension Benefit

1. Regular Retirement
2. Survivor Payment
3. Disability

Option Selected

1. Whole Life Annuity
2. 75% Joint and Contingent Annuity
3. 50% Joint and Contingent Annuity
4. 66 2/3% Joint and Survivor Annuity

Section 4.9: Pension Benefit Recipients Added to and Removed from Rolls

Year Ended	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percent Increase in Annual Pension Benefits	Average Annual Pension Benefit
	No. ¹	Annual Pension Benefits	No. ¹	Annual Pension Benefits	No. ¹	Annual Pension Benefits		
June 30, 2020	460	\$ 17,641,920	262	\$ 5,527,983	13,689	\$ 499,745,440	2.5%	\$ 36,507
June 30, 2019	468	18,004,896	254	871,684	13,491	487,631,503	3.6%	36,145
June 30, 2018	555	21,924,986	261	6,926,129	13,277	470,498,291	3.3%	35,437
June 30, 2017	487	17,151,684	230	7,736,025	12,983	455,499,434	2.1%	35,084
June 30, 2016	530	18,364,581	222	6,144,109	12,726	446,083,775	2.8%	35,053
June 30, 2015	888	34,120,658	220	3,531,501	12,418	433,863,303	7.6%	34,938
June 30, 2014	226	5,964,256	181	(1,150,187)	11,750	403,274,146	1.8%	34,321
June 30, 2013	576	19,387,542	172	1,652,575	11,705	396,159,703	4.7%	33,845
June 30, 2012	473	17,104,564	188	(617,561)	11,301	378,424,736	4.9%	33,486
June 30, 2011	564	19,546,369	146	1,464,766	11,016	360,702,611	5.3%	32,744

¹ Numbers are estimated, and include other internal transfers.

Section 5: Basis of the Actuarial Valuation

Section 5.1: Summary of Plan Provisions

Effective Date

July 1, 1955, with amendments through June 30, 2020. Chapter 97, 1990 Session Laws of Alaska, created a two-tier retirement system. Members who were first hired under TRS before July 1, 1990 (Tier 1) are eligible for different benefits than members hired after June 30, 1990 (Tier 2). Chapter 9, 2005 Session Laws of Alaska, closed the plan to new members hired after June 30, 2006.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the system. The Attorney General of the state is the legal counsel for the system and shall advise the administrator and represent the system in legal proceedings.

Prior to June 30, 2005, the Teachers' Retirement Board prescribed policies and adopted regulations and performed other activities necessary to carry out the provisions of the system. The Alaska State Pension Investment Board, Department of Revenue, Treasury Division was responsible for investing TRS funds.

On July 27, 2005, Senate Bill 141, enacted as Chapter 9, 2005 Session laws of Alaska, replaced the Teachers' Retirement Board and the Alaska State Pension Investment Board with the Alaska Retirement Management Board.

Employers Included

Currently, there are 56 employers participating in TRS, including the State of Alaska, 52 school districts, and three other eligible organizations.

Membership

Membership in TRS is mandatory for the following employees hired before July 1, 2006:

- certificated full-time and part-time elementary and secondary teachers, certificated school nurses, and certificated employees in positions requiring teaching certificates;
- positions requiring a teaching certificate as a condition of employment in the Department of Education and Early Development and the Department of Labor and Workforce Development;
- University of Alaska full-time and part-time teachers, and full-time administrative employees in positions requiring academic standing if approved by the TRS administrator;
- certain full-time or part-time teachers of Alaska Native language or culture who have elected to be covered under TRS;
- members on approved sabbatical leave under AS 14.20.310;
- certain State legislators who have elected to be covered under TRS; and
- a teacher who has filed for worker's compensation benefits due to an on-the-job assault and who, as a result of the physical injury, is placed on leave without pay.

Employees participating in the University of Alaska's Optional Retirement Plan or other retirement plans funded by the State are not covered by TRS.

Employees who work half-time in TRS and Public Employees' Retirement System (PERS) simultaneously are eligible for half-time TRS and PERS credit.

Senate Bill 141, signed into law on July 27, 2005, closes the plan effective July 1, 2006 to new members first hired on or after July 1, 2006.

Credited Service

TRS members receive a year of membership credit if they work a minimum of 172 days during the school year (July 1 through June 30 of the following year). Fractional credit is determined based on the number of days worked. Part-time members who work at least 50% of full-time receive membership credit for each day in proportion to full-time service. Credit is granted for all Alaskan public school service.

Members may claim other types of service, including:

- Outside teaching service in out-of-state schools or Alaska private schools (not more than ten years may be claimed);
- Military service (not more than five years of military service or ten years of combined outside and military service may be claimed);
- Alaska Bureau of Indian Affairs (BIA) service;
- Retroactive Alaskan service that was not creditable at the time it occurred, but later became creditable because of legislative change;
- Unused sick leave credit after members retire; and
- Leave of absence without pay.

Except for retroactive Alaska service that occurred before July 1, 1955, and unused sick leave, contributions are required for all claimed service.

Members receiving TRS disability benefits continue to earn TRS credit while disabled.

Survivors who are receiving occupational death benefits continue to earn TRS service credit while occupational survivor benefits are being paid.

Employer Contributions

TRS employers contribute the amounts required, in addition to employees' contributions, to fund the benefits of the system.

The normal cost rate is a uniform rate for all participating employers (less the value of members' contributions).

The past service rate is a uniform rate for all participating employers to amortize the unfunded past service liability with payments that are a level percentage of payroll amount over a closed 25-year period starting June 30, 2014. Effective June 30, 2018, each future year's unfunded service liability is separately amortized on a level percent of pay basis over 25 years.

Employer rates cannot be less than the normal cost rate.

Pursuant to AS14.25.070 effective July 1, 2008, each TRS employer will pay a simple uniform contribution rate of 12.56% of member payroll.

Additional State Contributions

Pursuant to AS14.25.085 effective July 1, 2008, the State shall contribute an amount (in addition to the State contribution as an employer) that, when combined with the employer contribution of 12.56%, will be sufficient to pay the total contribution rate adopted by the Board.

Member Contributions

Mandatory Contributions: Members are required to contribute 8.65% of their base salaries. Members' contributions are deducted from gross salaries before federal income taxes are withheld.

Contributions for Claimed Service: Member contributions are also required for most of the claimed service described above.

1% Supplemental Contributions: Members who joined the system before July 1, 1982 and elected to participate in the supplemental contributions provision are required to contribute an additional 1% of their salaries. Supplemental contributions are deducted from gross salaries after federal income taxes are withheld. Under the supplemental provision, an eligible spouse or dependent child will receive a survivor's allowance or spouse's pension if the member dies (see below). Supplemental contributions are only refundable upon death (see below).

Interest: Members' contributions earn 4.5% interest, compounded annually on June 30.

Refund of Contributions: Terminated members may receive refunds of their member contribution accounts which includes their mandatory contributions, indebtedness payments, and interest earned. Terminated members' accounts may be attached to satisfy claims under Alaska Statute 09.38.065, federal income tax levies, and valid Qualified Domestic Relations Orders.

Reinstatement of Contributions: Refunded accounts and the corresponding TRS service may be reinstated upon reemployment in TRS prior to July 1, 2010. Interest accrues on refunds until paid in full or members retire.

Retirement Benefits

Eligibility

- a. Members, including deferred vested members, are eligible for normal retirement at age 55 or early retirement at age 50 if they were hired before July 1, 1990 (Tier 1), and age 60 or early retirement at age 55 if they were hired on or after July 1, 1990 (Tier 2). Additionally, they must have at least:
 - (i) eight years of paid-up membership service;
 - (ii) 15 years of paid-up creditable service, the last five years of which are membership service, and they were first hired under TRS before July 1, 1975;
 - (iii) five years of paid-up membership service and three years of paid-up Alaska Bureau of Indian Affairs service;
 - (iv) 12 years of combined part-time and full-time paid-up membership service;
 - (v) two years of paid-up membership service if they are vested in PERS; or
 - (vi) one year of paid-up membership service if they are retired from PERS.
- b. Members may retire at any age when they have:
 - (i) 25 years of paid-up creditable service, the last five years of which are membership service;
 - (ii) 20 years of paid-up membership service;
 - (iii) 20 years of combined paid-up membership and Alaska Bureau of Indian Affairs service, the last five years of which are membership service; or
 - (iv) 20 years of combined paid-up part-time and full-time membership service.

Benefit Type

Lifetime benefits are paid to members. Eligible members may receive normal, unreduced benefits when they (1) reach normal retirement age and complete the service required; or (2) satisfy the minimum service requirements to retire at any age under (b) above. Members may receive early, actuarially reduced benefits when they reach early retirement age and complete the service required.

Members may select joint and survivor options and a last survivor option. Under these options and early retirement, benefits are actuarially adjusted so that members receive the actuarial equivalents of their normal benefit amounts.

Benefit Calculations

Retirement benefits are calculated by multiplying the average base salary (ABS) times the total TRS service times the percentage multiplier. The ABS is determined by averaging the salaries earned during the three highest school years. Members must earn at least 115 days of credit in a school year to include it in the ABS calculation. TRS pays a minimum benefit of \$25.00 per month for each year of service when the calculated benefit is less.

The percentage multipliers are 2% for the first 20 years and 2.5% for all remaining service. Service before July 1, 1990 is calculated at 2%.

Indebtedness

Members who terminate and refund their TRS contributions are not eligible to retire unless they return to TRS employment and pay back their refunds plus interest or accrue additional service which qualifies them for retirement. TRS refunds must be paid in full if the corresponding service is to count toward the minimum service requirements for retirement. Refunded TRS service is included in total service for the purpose of calculating retirement benefits. However, when refunds are not completely paid before retirement, benefits are actuarially reduced for life. Indebtedness balances may also be created when a member purchases qualified claimed service.

Reemployment of Retired Members

Retirees who return to work in a permanent full-time or part-time TRS position after a Normal Retirement are eligible to return under the Standard Option.

Under the Standard Option, retirement and retiree healthcare benefits are suspended while retired members are reemployed under TRS. During reemployment, members earn additional TRS service and contributions are withheld from their wages.

Members retired under the Retirement Incentive Programs (RIPs) who return to employment will:

- a. forfeit the three years of incentive credits that they received;
- b. owe TRS 110% of the benefits that they received under the RIP, which may include costs for health insurance, excluding amounts that they paid to participate; and
- c. be charged 7% interest from the date that they are reemployed until their indebtedness is paid in full or they retire again. If the indebtedness is not completely paid, future benefits will be actuarially reduced for life.

Employers make contributions to the unfunded liability of the plan on behalf of rehired retired members at the rate the employer is making contributions to the unfunded liability of the plan for other members.

Postemployment Healthcare Benefits

When pension benefits begin, major medical benefits are provided by TRS to (1) all employees first hired before July 1, 1990 (Tier 1) and their surviving spouses and (2) members and their surviving spouses who have 25 years of membership service, are disabled or age 60 or older, regardless of their initial hire dates. Employees first hired after June 30, 1990 (Tier 2) and their surviving spouses may receive major medical benefits prior to age 60 by paying premiums.

Medical, prescription drug, dental, vision, and audio coverage is provided through the AlaskaCare Retiree Health Plan. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination. Participants in dental, vision, and audio coverage pay a full self-supporting rate and those benefits are not included in this valuation.

Surviving spouses continue coverage only if a pension payment form that provided survivor benefits was elected. Alternate payees (i.e. individuals who are the subject of a domestic relations order or DRO) are allowed to participate in the plan, but must pay the full cost.

Where premiums are required prior to age 60 (Tier 2), the valuation bases this payment upon the age of the retiree.

Participants in the defined benefit plan are covered under the following benefit design:

Plan Feature	Amounts
Deductible (single/family)	\$150 / \$450
Coinsurance (most services)	20%
Outpatient surgery/testing	0%
Maximum Out-of-Pocket (single/family, excluding deductible)	\$800 / \$2,400
Rx Copays (generic/brand/mail-order), does not apply to OOP max	\$4 / \$8 / \$0
Lifetime Maximum	\$2,000,000

The plan coordinates with Medicare on a traditional Coordination of Benefits Method. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.

Disability Benefits

Monthly disability benefits are paid to permanently disabled members until they die, recover, or become eligible for normal retirement. To be eligible, members must have at least five years of paid-up membership service.

Disability benefits are equal to 50% of the member's base salary at the time of disability. The benefit is increased by 10% of the base salary for each minor child, up to a maximum of 40%. Members continue to earn TRS service until eligible for normal retirement.

Members are appointed to normal retirement on the first of the month after they become eligible.

Death Benefits

Monthly death benefits may be paid to a spouse or dependent children upon the death of a member. If monthly benefits are not payable under the supplemental contributions provision or occupational and non-occupational death provisions, the designated beneficiary receives the lump sum benefit described below.

Occupational Death

When an active member dies from occupational causes, a monthly survivor's pension may be paid to the spouse, unless benefits are payable under the supplemental contributions provision (see below). The pension equals 40% of the member's base salary on the date of death or disability, if earlier. If there is no spouse, the pension may be paid to the member's dependent children. On the member's normal retirement date, the benefit converts to a normal retirement benefit. The normal benefit is based on the member's average base salary on the date of death and service, including service accumulated from the date of the member's death to the normal retirement date.

Non-Occupational Death

When a vested member dies from non-occupational causes, the surviving spouse may elect to receive a monthly 50% joint and survivor benefit or a lump sum benefit, unless benefits are payable under the supplemental contributions provision (see below). The monthly benefit is calculated on the member's average base salary and TRS service accrued at the time of death.

Lump Sum Benefit

Upon the death of an active member who has less than one year of service or an inactive member who is not vested, the designated beneficiary receives the member's contribution account, which includes mandatory contributions, indebtedness payments, and interest earned. Any supplemental contributions will also be refunded. If the member has more than one year of TRS service or is vested, the beneficiary also receives \$1,000 and \$100 for each year of TRS service, up to a maximum of \$3,000. An additional \$500 may be payable if the member is survived by dependent children.

Supplemental Contributions Provision

Members are eligible for supplemental coverage if they joined TRS before July 1, 1982, elected to participate in the supplemental provision, and made the required contributions. A survivor's allowance or spouse's pension (see below) may be payable if the member made supplemental contributions for at least one year and dies while in membership service or while disabled under TRS. In addition, the allowance and pension may be payable if the member dies while retired or in deferred vested status if supplemental contributions were made for at least five years.

- a. **Survivor's Allowance:** If the member is survived by dependent children, the surviving spouse and dependent children are entitled to a survivor's allowance. The allowance for the spouse is equal to 35% of the member's base salary at the time of death or disability, plus 10% for each dependent child up to a maximum of 40%. The allowance terminates and a spouse's pension becomes payable when there is no longer an eligible dependent child.
- b. **Spouse's Pension:** The spouse's pension is equal to 50% of the retirement benefit that the deceased member was receiving or the unreduced retirement benefit that the deceased member would have received if retired at the time of death. The spouse's pension begins on the first of the month after the member's death or termination of the survivor's allowance.

Death After Retirement

If a joint and survivor option was selected at retirement, the eligible spouse receives continuing, lifetime monthly benefits after the member dies. A survivor's allowance or spouse's pension may be payable if the member participated in the supplemental contributions provision. If a joint and survivor option was not selected and benefits are not payable under the supplemental contributions provision, the designated beneficiary receives the member's contribution account, less any benefits already paid and the member's last benefit check.

Postretirement Pension Adjustments

Postretirement pension adjustments (PRPAs) are granted annually to eligible benefit recipients when the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage increases during the preceding calendar year. PRPAs are calculated by multiplying the recipient's base benefit including past PRPAs, but excluding the Alaska COLA, times:

- a. 75% of the CPI increase in the preceding calendar year or 9%, whichever is less, if the recipient is at least age 65 or on TRS disability; or
- b. 50% of the CPI increase in the preceding calendar year or 6%, whichever is less, if the recipient is at least age 60, or under age 60 if the recipient has been receiving benefits for at least eight years.

Ad hoc PRPAs, up to a maximum of 4%, may be granted to eligible recipients who were first hired before July 1, 1990 (Tier 1) if the CPI increases and the funded ratio is at least 105%.

In a year where an ad hoc PRPA is granted, eligible recipients will receive the higher of the two calculations.

Alaska Cost-of-Living Allowance (COLA)

Eligible benefit recipients who reside in Alaska receive an Alaska COLA equal to 10% of their base benefits. The following benefit recipients are eligible:

- a. members who were first hired under TRS before July 1, 1990 (Tier 1) and their survivors;
- b. members who were first hired under TRS after June 30, 1990 (Tier 2) and their survivors if they are at least age 65; and
- c. all disabled members.

Changes in Benefit Provisions Valued Since the Prior Valuation

There were no changes in benefit provisions since the prior valuation.

Section 5.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006. Changes in methods were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was changed effective June 30, 2014.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay.

Effective June 30, 2018, the Board adopted a layered UAAL amortization method: Layer #1 equals the sum of (i) the UAAL at June 30, 2018 based on the 2017 valuation, plus (ii) the FY18 experience gain/loss. Layer #1 is amortized over the remainder of the 25-year closed period that was originally established in 2014¹. Layer #2 equals the change in UAAL at June 30, 2018 due to the experience study and EGWP implementation. Layer #2 is amortized over a separate closed 25-year period starting in 2018. Future layers will be created each year based on the difference between actual and expected UAAL occurring that year, and will be amortized over separate closed 25-year periods. The UAAL amortization continues to be on a level percent of pay basis. State statutes allow the contribution rate to be determined on payroll for all members, defined benefit and defined contribution member payroll combined.

Projected pension and postemployment healthcare benefits were determined for all active members. Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year from the assumed entry age to the assumed retirement age were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

¹ Layer #1 is referred to as "initial amount" in Sections 1.2 and 1.3.

Valuation of Assets

The actuarial asset value was reinitialized to equal Fair Value of Assets as of June 30, 2014. Beginning in FY15, the asset valuation method recognizes 20% of the gain or loss each year, for a period of five years. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

This section outlines the detailed methodology used in the internal model developed by Buck to calculate the initial per capita claims cost rates for the TRS postemployment healthcare plan. Note that the methodology reflects the results of our annual experience rate update for the period from July 1, 2019 to June 30, 2020.

Base claims cost rates are incurred healthcare costs expressed as a rate per member per year. Ideally, claims cost rates should be derived for each significant component of cost that can be expected to require differing projection assumptions or methods (i.e., medical claims, prescription drug claims, administrative costs, etc). Separate analysis is limited by the availability and historical credibility of cost and enrollment data for each component of cost. This valuation reflects non-prescription claims separated by Medicare status, including eligibility for free Part A coverage. Prescription costs are analyzed separately as in prior valuations. Administrative costs are assumed in the final per capita claims cost rates used for valuation purposes, as described below. Analysis to date on Medicare Part A coverage is limited since Part A claim data is not available by individual, nor is this status incorporated into historical claim data.

Benefits

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan and is available to employees of the State and subdivisions who meet retirement criteria based on the retirement plan tier in effect at their date of hire. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination for those Medicare-eligible. Dental, vision and audio claims (DVA) are excluded from data analyzed for this valuation because those are retiree-pay all benefits where rates are assumed to be self-supporting. Buck relies upon rates set by a third-party for the DVA benefits. Buck reviewed historical rate-setting information and views contribution rate adjustments made are not unreasonable.

Administration and Data Sources

The plan was administered by Wells Fargo Insurance Services (acquired by HealthSmart, in January 2012) from July 1, 2009 through December 31, 2013 and by Aetna effective January 1, 2014.

Claims incurred for the period from July 2018 through June 2020 (FY19 through FY20) were provided by the State of Alaska from reports extracted from their data warehouse, which separated claims by Medicare status. Monthly enrollment data for the same period was provided by Aetna.

Aetna also provided census information identifying Medicare Part B only participants. These participants are identified when hospital claims are denied by Medicare; Aetna then flags that participant as a Part B only participant. Buck added newly identified participants to our list of Medicare Part B only participants. Buck assumes that once identified as Part B only, that participant remains in that status until we are notified otherwise.

Aetna provided a snapshot file as of July 1, 2020 of retirees and dependents that included a coverage level indicator. The monthly enrollment data includes double coverage participants. These are participants whereby both the retiree and spouse are retirees from the State and both are reflected with Couple coverage in the enrollment. In this case, such a couple would show up as four members in the

monthly enrollment (each would be both a retiree and a spouse). As a result, the snapshot census file was used to adjust the total member counts in the monthly enrollment reports to estimate the number of unique participants enrolled in coverage. Based on the snapshot files from the last two valuations, the total member count in the monthly enrollment reports needs to be reduced by approximately 13% to account for the number of participants with double coverage.

Aetna does not provide separate experience by Medicare status in standard reporting so the special reports mentioned above from the data warehouse were used this year to obtain that information and incorporate it into the per capita rate development for each year of experience (with corresponding weights applied in the final per capita cost).

Methodology

Buck projected historical claim data to FY21 for retirees using the following summarized steps:

1. Develop historical annual incurred claim cost rates – an analysis of medical costs was completed based on claims information and enrollment data provided by the State of Alaska and Aetna for each year in the experience period of FY19 through FY20.
 - Costs for medical services and prescriptions were analyzed separately, and separate trend rates were developed to project expected future medical and prescription costs for the valuation year (e.g. from the experience period up through FY21).
 - Because the reports provided reflected incurred claims, no additional adjustment was needed to determine incurred claims to be used in the valuation.
 - An offset for costs expected to be reimbursed by Medicare was incorporated beginning at age 65. Alaska retirees who do not have 40 quarters of Medicare-covered compensation do not qualify for Medicare Part A coverage free of charge. This is a relatively small and closed group. Medicare was applied to State employment for all employees hired after March 31, 1986. For the “no-Part A” individuals who are required to enroll in Medicare Part B, the State is the primary payer for hospital bills and other Part A services. Claim experience is not available separately for participants with both Medicare Parts A and B and those with Part B only. For Medicare Part B only participants, a lower average claims cost was applied to retirees covered by both Medicare Part A and B vs. retirees covered only by Medicare Part B based upon manual rate models that estimate the Medicare covered proportion of medical costs. To the extent that no-Part A claims can be isolated and applied strictly to the appropriate closed group, actuarial accrued liability will be more accurate.
 - Based on census data received from Aetna, less than 1% of the current retiree population was identified as having coverage only under Medicare Part B. We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.
 - Based upon a reconciliation of valuation census data to the snapshot eligibility files provided by Aetna as of July 1, 2019, and July 1, 2020, Buck adjusted member counts used for duplicate records where participants have double coverage; i.e. primary coverage as a retiree and secondary coverage as the covered spouse of another retiree. This is to reflect the total cost per distinct individual/member which is then applied to distinct members in the valuation census.
 - Buck understands that pharmacy claims reported do not reflect rebates. Based on actual pharmacy rebate information provided by Aetna for years through 2018 and Optum for January 2019 through June 2020, rebates were assumed to be 17% of prescription drug claims for FY19 and 19.5% of prescription drug claims for FY20.
2. Develop estimated EGWP reimbursements – Segal provided estimated 2021 EGWP subsidies, developed with the assistance of OptumRx. These amounts are applicable only to Medicare-eligible participants.

3. Adjust for claim fluctuation, anomalous experience, etc. – explicit adjustments are often made for anticipated large claims or other anomalous experience. FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. Due to group size and demographics, we did not make any additional large claim adjustments. We do blend both Alaska plan-specific and national trend factors as described below. Buck compared data utilized to lag reports and quarterly plan experience presentations provided by the State and Aetna to assess accuracy and reasonableness of data.
4. Trend all data points to the projection period – project prior years’ experience forward to FY21 for retiree benefits on an incurred claim basis. Trend factors derived from historical Alaska-specific experience and national trend factors are shown in the table in item 5 below.
5. Apply credibility to prior experience – adjust prior year’s data by assigning weight to recent periods, as shown at the right of the table below. The Board approved a change in the weighting of experience periods beginning with the June 30, 2017 valuation as outlined below. Note also that we averaged projected plan costs using Alaska-specific trend factors and national trend factors, assigning 75% weight to Alaska-specific trends and 25% to national trends:

Alaska-Specific and National Average Weighted Trend from Experience Period to Valuation Year			
Experience Period	Medical	Prescription	Weighting Factors
FY19 to FY20	7.3% Pre-Medicare / 4.6% Medicare	1.2%	50%
FY20 to FY21	6.3% Pre-Medicare / 5.2% Medicare	7.6%	50%

Trend assumptions used for rate development are assessed annually and as additional/improved reporting becomes available, we will incorporate into rate development as appropriate.

6. Develop separate administration costs – no adjustments were made for internal administrative costs. Third party retiree plan administration fees for FY21 are based upon total fees projected to 2021 by Segal based on actual FY20 fees. The annual per participant per year administrative cost rate for medical and prescription benefits is \$449.

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, and was in effect at the time the legislation was enacted, not all provisions of the health reform legislation apply to the State plan. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. We reviewed the impact of including these provisions, but there was no decision made to adopt them, and no requirement to do so.

Because Transitional Reinsurance fees are only in effect until 2016, we excluded these for valuation purposes.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

Data

In accordance with actuarial standards, we note the following specific data sources and steps taken to value retiree medical benefits:

The Division of Retirement and Benefits provided pension valuation census data, which for people currently in receipt of healthcare benefits was supplemented by coverage data from the healthcare claims administrator (Aetna).

Certain adjustments and assumptions were made to prepare the data for valuation:

- Some records provided on the Aetna data were associated with a participant social security number not listed on the RIN-to-SSN translation file. We reconciled those participants with the pension valuation data as either a surviving spouse or a retiree in the appropriate plan based on account structure information in the Aetna data.
- All records provided with retiree medical coverage on the Aetna data were included in this valuation and we relied on the Aetna data as the source of medical coverage for current retirees and their dependents.
- Some records in the Aetna data were duplicates due to the double coverage (i.e. coverage as a retiree and as a spouse of another retiree) allowed under the plan. Records were adjusted for these members so that each member was only valued once. Any additional value of the double coverage (due to coordination of benefits) is small and reflected in the per capita costs.
- Covered children included in the Aetna data were valued until age 23, unless disabled. We assumed that those dependents over 23 were only eligible and valued due to being disabled.
- For individuals included in the pension data expecting a future pension, we valued health benefits starting at the same point that the pension benefit is assumed to start.

We are not aware of any other data issues that would be expected to have a material impact on the results and there are no unresolved matters related to the data.

The chart below shows the basis of setting the per capita claims cost assumption, which includes both PERS and TRS.

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
A. Fiscal 2019				
1. Incurred Claims	\$ 230,731,518	\$ 80,855,220	\$ 63,846,605	\$ 183,281,273
2. Adjustments for Rx Rebates	0	0	(10,853,923)	(31,157,816)
3. Net incurred claims	\$ 230,731,518	\$ 80,855,220	\$ 52,992,682	\$ 152,123,456
4. Average Enrollment	20,625	42,843	20,625	42,843
5. Claim Cost Rate (3) / (4)	11,187	1,887	2,569	3,551
6. Trend to Fiscal 2021	1.141	1.101	1.089	1.089
7. Fiscal 2021 Incurred Cost Rate (5) x (6)	\$ 12,762	\$ 2,077	\$ 2,798	\$ 3,867

B. Fiscal 2020				
1. Incurred Claims	\$ 229,531,664	\$ 89,497,345	\$ 64,442,660	\$ 188,022,328
2. Adjustments for Rx Rebates	0	0	(12,566,319)	(36,664,354)
3. Net incurred claims	\$ 229,531,664	\$ 89,497,345	\$ 51,876,341	\$ 151,357,974
4. Average Enrollment	19,354	44,965	19,354	44,965
5. Claim Cost Rate (3) / (4)	11,860	1,990	2,680	3,366
6. Trend to Fiscal 2021	1.063	1.052	1.076	1.076
7. Fiscal 2021 Incurred Cost Rate (5) x (6)	\$ 12,609	\$ 2,094	\$ 2,885	\$ 3,623

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
C. Incurred Cost Rate by Fiscal Year				
1. Fiscal 2019 A.(7)	12,762	2,077	2,798	3,867
2. Fiscal 2020 B.(7)	12,609	2,094	2,885	3,623

D. Weighting by Fiscal Year				
1. Fiscal 2019	50%	50%	50%	50%
2. Fiscal 2020	50%	50%	50%	50%

E. Fiscal 2021 Incurred Cost Rate				
1. Rate at Average Age C x D	\$ 12,685	\$ 2,086	\$ 2,842	\$ 3,745
2. Average Aging Factor	0.826	1.263	0.838	1.121
3. Rate at Age 65 (1) / (2)	\$ 15,360	\$ 1,651	\$ 3,393	\$ 3,340

F. Development of Part A&B and Part B Only Cost from Pooled Rate Above	
1. Part A&B Average Enrollment	44,568
2. Part B Only Average Enrollment	398
3. Total Medicare Average Enrollment B(4)	44,965
4. Cost ratio for those with Part B only to those with Parts A&B	3.300
5. Factor to determine cost for those with Parts A&B (2) / (3) x (4) + (1) / (3) x 1.00	1.020
6. Medicare per capita cost for all participants: E(3)	\$ 1,651
7. Cost for those eligible for Parts A&B: (6) / (5)	\$ 1,618
8. Cost for those eligible for Part B only: (7) x (4)	\$ 5,340

Following the development of total projected costs, a distribution of per capita claims cost was developed. This was accomplished by allocating total projected costs to the population census used in the valuation. The allocation was done separately for each of prescription drugs and medical costs for the Medicare eligible and pre-Medicare populations. The allocation weights were developed using participant counts by age and assumed morbidity and aging factors. Results were tested for reasonableness based on historical trend and external benchmarks for costs paid by Medicare.

Below are the results of this analysis:

**Distribution of Per Capita Claims Cost by Age
for the Period July 1, 2020 through June 30, 2021**

Age	Medical and Medicare Parts A & B	Medical and Medicare Part B Only	Prescription Drug	Medicare EGWP Subsidy
45	\$ 9,374	\$ 9,374	\$ 2,072	\$ 0
50	10,605	10,605	2,461	0
55	11,999	11,999	2,923	0
60	13,576	13,576	3,149	0
65	1,618	5,340	3,340	1,003
70	1,876	6,191	3,688	1,107
75	2,174	7,177	4,071	1,223
80	2,401	7,923	3,971	1,192

Section 5.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2020 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 white-collar employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 15% of the time.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

93% of male and 90% of female rates of RP-2014 white-collar healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Table 2).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Retirement

Retirement rates based upon the 2013-2017 actual experience (see Table 4).

Deferred vested members are assumed to retire at their earliest unreduced retirement date.

The modified cash refund annuity is valued as a three-year certain and life annuity.

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Pension

85% of male members and 75% of female members are assumed to be married at termination from active service.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse.

Dependent Children

- Pension: For the participants who are assumed to be married, those between ages 25 and 45 are assumed to have two dependent children.
- Healthcare: Benefits for dependent children have been valued only for members currently covering their dependent children. These benefits are only valued through the dependent children's age 23 (unless the child is disabled).

Contribution Refunds

0% of terminating members with vested benefits are assumed to have their contributions refunded. 100% of those with non-vested benefits are assumed to have their contributions refunded.

Imputed Data

Data changes from the prior year which are deemed to have an immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Active Rehire Assumption

The Normal Cost used for determining contribution rates and in the projections includes a rehire assumption to account for anticipated rehires. The Normal Cost shown in the report includes the following assumptions (which were developed based on the five years of rehire loss experience through June 30, 2017). For projections, these assumptions were assumed to grade to zero uniformly over a 20-year period.

- Pension: 15.57%
- Healthcare: 12.03%

Re-Employment Option

All re-employed retirees are assumed to return to work under the Standard Option.

Active Data Adjustment

No adjustment was made to reflect participants who terminate employment before the valuation date and are subsequently rehired after the valuation date.

Alaska Cost-of-Living Adjustments (COLA)

Of those benefit recipients who are eligible for the Alaska COLA, 60% are assumed to remain in Alaska and receive the COLA.

Postretirement Pension Adjustment (PRPA)

50% and 75% of assumed inflation, or 1.25% and 1.875% respectively, is valued for the annual automatic PRPA as specified in the statute.

Expenses

The investment return assumption is net of investment expenses. The Normal Cost as of June 30, 2020 was increased by the following amounts for administrative expenses (for projections, the percent increase was assumed to remain constant in future years):

- Pension: \$3,003,000
- Healthcare: \$1,362,000

Part-Time Status

Part-time employees are assumed to earn 0.75 years of credited service per year.

Sick Leave

4.5 days of unused sick leave for each year of service are assumed to be available to be credited once the member is retired, terminates or dies.

Service

Total credited service is provided by the State. This service is assumed to be the only service that should be used to calculate benefits. Additionally, the State provides claimed service (including Bureau of Indian Affairs Service). Claimed service is used for vesting and eligibility purposes as described in Section 5.1.

Final Average Earnings

Final Average Earnings is provided on the data for active members. This amount is used as a minimum in the calculation of the average earnings in the future.

Per Capita Claims Cost

Sample claims cost rates adjusted to age 65 for FY21 medical and prescription drugs are shown below:

	Medical	Prescription Drugs
Pre-Medicare	\$ 15,360	\$ 3,393
Medicare Parts A & B	\$ 1,618	\$ 3,340
Medicare Part B Only	\$ 5,340	\$ 3,340
Medicare Part D – EGWP	N/A	\$ 1,003

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2021 fiscal year (July 1, 2020 – June 30, 2021).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

\$449 per person per year; assumed to increase at 4.5% per year.

Medicare Part B Only

We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.

Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.5% is applied to the FY21 pre-Medicare medical claims costs to get the FY22 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY21	6.5%	5.4%	7.5%
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retired Member Contributions for Medical Benefits

Currently contributions are required for TRS members who are under age 60 and have less than 25 years of service. Eligible Tier 1 members are exempt from contribution requirements. Annual FY21 contributions based on monthly rates shown below for calendar 2021 are assumed based on the coverage category for current retirees. The composite rate shown is used for current active and inactive members in Tier 2 who are assumed to retire prior to age 60 with less than 25 years of service and who are not disabled. For dependent children, we value 1/3 of the annual retiree contribution to estimate the per child rate based upon the assumed number of children in rates where children are covered.

Coverage Category	Calendar 2021 Annual Contribution	Calendar 2021 Monthly Contribution	Calendar 2020 Monthly Contribution
Retiree Only	\$ 8,448	\$ 704	\$ 741
Retiree and Spouse	\$ 16,896	\$ 1,408	\$ 1,482
Retiree and Child(ren)	\$ 11,940	\$ 995	\$ 1,047
Retiree and Family	\$ 20,388	\$ 1,699	\$ 1,788
Composite	\$ 12,552	\$ 1,046	\$ 1,101

Trend Rate for Retired Member Medical Contributions

The table below shows the rate used to project the retired member medical contributions from the shown fiscal year to the next fiscal year. For example, 0.0% is applied to the FY21 retired member medical contributions to get the FY22 retired member medical contributions.

Trend Assumptions	
FY21	0.0%
FY22	0.0%
FY23+	4.0%

Graded trend rates for retired member medical contributions are consistent with the rates used for the June 30, 2019 valuation. Actual FY21 retired member medical contributions are reflected in the valuation.

Healthcare Participation

100% of system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible. 20% of non-system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible.

Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 5.2. Retired member contributions were updated to reflect the 5% decrease from CY20 to CY21. The amounts included in the Normal Cost for administrative expenses were changed from \$3,034,000 to \$3,003,000 for pension and from \$1,439,000 to \$1,362,000 for healthcare (based on the most recent two years of actual administrative expenses paid from plan assets).

DRAFT

Table 1: Salary Scale

Years of Service	Percent Increase
0	6.75%
1	6.25%
2	5.75%
3	5.25%
4	4.75%
5	4.25%
6	3.75%
7	3.65%
8	3.55%
9	3.45%
10	3.35%
11	3.25%
12	3.15%
13	3.05%
14	2.95%
15	2.85%
16+	2.75%

Table 2: Turnover Rates

Select Rates during the First 8 Years of Employment

Years of Service	Male	Female
0	20.40%	17.00%
1	20.40%	17.00%
2	16.80%	14.00%
3	14.40%	12.00%
4	12.00%	10.00%
5	10.80%	9.00%
6	9.00%	7.50%
7	7.20%	6.00%

Ultimate Rates after the First 8 Years of Employment

Age	Male	Female	Age	Male	Female
22	2.62%	3.79%	39	2.57%	3.74%
23	2.62%	3.79%	40	2.26%	2.75%
24	2.61%	3.79%	41	2.26%	2.75%
25	2.61%	3.79%	42	2.25%	2.74%
26	2.61%	3.79%	43	2.24%	2.73%
27	2.60%	3.79%	44	2.23%	2.73%
28	2.60%	4.27%	45	2.22%	2.72%
29	2.60%	4.76%	46	2.21%	2.71%
30	2.60%	5.24%	47	2.20%	2.70%
31	2.60%	5.73%	48	2.18%	2.69%
32	2.59%	6.22%	49	2.16%	2.68%
33	2.59%	5.72%	50	3.43%	4.42%
34	2.59%	5.23%	51	3.39%	4.39%
35	2.59%	4.74%	52	3.35%	4.36%
36	2.58%	4.25%	53	3.30%	4.32%
37	2.58%	3.75%	54	3.00%	7.56%
38	2.58%	3.75%	55+	2.00%	5.00%

Table 3: Disability Rates

Age	Male	Female
< 31	0.0337%	0.0612%
31	0.0337%	0.0613%
32	0.0337%	0.0613%
33	0.0342%	0.0622%
34	0.0347%	0.0631%
35	0.0353%	0.0641%
36	0.0357%	0.0650%
37	0.0362%	0.0659%
38	0.0371%	0.0674%
39	0.0379%	0.0689%
40	0.0387%	0.0703%
41	0.0395%	0.0718%
42	0.0403%	0.0733%
43	0.0423%	0.0770%
44	0.0443%	0.0806%
45	0.0464%	0.0843%
46	0.0483%	0.0879%
47	0.0504%	0.0916%
48	0.0536%	0.0975%
49	0.0569%	0.1034%
50	0.0601%	0.1093%
51	0.0634%	0.1152%
52	0.0666%	0.1211%
53	0.0746%	0.1356%
54	0.0826%	0.1501%

Table 4: Retirement Rates

Age	Reduced		Unreduced	
	Male	Female	Male	Female
< 45	N/A	N/A	3.0%	3.0%
45	N/A	N/A	5.0%	5.0%
46	N/A	N/A	5.0%	8.0%
47	N/A	N/A	5.0%	8.0%
48	N/A	N/A	5.0%	8.0%
49	N/A	N/A	5.0%	8.0%
50	10.0%	10.0%	5.0%	14.0%
51	10.0%	10.0%	8.0%	13.0%
52	10.0%	10.0%	15.0%	13.0%
53	10.0%	12.0%	15.0%	14.0%
54	10.0%	12.0%	15.0%	15.0%
55	15.0%	8.0%	20.0%	17.0%
56	10.0%	8.0%	17.0%	17.0%
57	10.0%	8.0%	15.0%	17.0%
58	10.0%	8.0%	20.0%	17.0%
59	10.0%	8.0%	20.0%	23.0%
60	N/A	N/A	25.0%	23.0%
61	N/A	N/A	18.0%	23.0%
62	N/A	N/A	18.0%	21.0%
63	N/A	N/A	18.0%	21.0%
64	N/A	N/A	18.0%	26.0%
65	N/A	N/A	30.0%	21.0%
66	N/A	N/A	25.0%	21.0%
67	N/A	N/A	25.0%	21.0%
68	N/A	N/A	25.0%	26.0%
69	N/A	N/A	35.0%	26.0%
70	N/A	N/A	30.0%	26.0%
71	N/A	N/A	30.0%	37.0%
72	N/A	N/A	30.0%	37.0%
73	N/A	N/A	30.0%	37.0%
74	N/A	N/A	30.0%	37.0%
75 - 79	N/A	N/A	50.0%	50.0%
80+	N/A	N/A	100.0%	100.0%

Section 6: Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important.

Actuarial Standard of Practice No. 51 (ASOP 51)¹ requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plan's future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the 7.38% expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk – potential that future salaries will be different than expected in the actuarial valuation
- Inflation Risk – potential that the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage is different than the 2.5% assumed in the valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

¹ ASOP 51 does not apply to the healthcare portion of the plan. Accordingly, all figures in this section relate to the pension portion.

Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.4 of this report. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plan when the employer's and/or State's actual contribution amount and the actuarially determined contribution differ.

- If the actual contribution is lower than the actuarially determined contribution, the plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).
- As long as the Board consistently adopts the actuarially determined contributions, this risk is mitigated due to Alaska statutes requiring the State to contribute additional funds necessary to pay the total contributions adopted by the Board.

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plan's asset allocation will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase actuarial accrued liability by approximately 11%.
- This risk may be increased due to the plan being closed to new entrants. As the plan continues to mature, the magnitude of negative cash flow discussed in the Plan Maturity Measures later in this section will grow, thereby creating a need for more liquid assets that may not garner the same long-term return as currently assumed.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plan could increase.

- The mortality assumption for the plan mitigates this risk by assuming future improvement in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the plan.
- The Postretirement Pension Adjustments and Alaska Cost-of-Living Allowance increase longevity risk because members who live longer than expected will incur more benefit payment increases than expected and therefore increase costs.

Salary Increase Risk

Plan costs will be increased if actual salary increases are larger than expected.

- Higher-than-expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Inflation Risk

Plan costs will be increased if the actual CPI for Anchorage is greater than the 2.5% assumed in the valuation.

- Retirement benefits will be greater than expected if the CPI is greater than the assumed rate, which will increase costs.
- This risk is mitigated by the 75% and 50% of CPI provisions and the 9% and 6% maximums.
- This risk is also mitigated by the age and time in payment requirements to receive an increase.
- Inflation risk may be associated with the interaction of inflation with other assumptions, but this is not significant as a standalone assumption, and therefore is considered as part of the associated assumption risk instead of being discussed here.

Other Demographic Risk

The plan is subject to risks associated with other demographic assumptions (e.g., retirement, termination, and retired members remaining in Alaska assumptions). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plan. The demographic assumptions used in the valuation are re-evaluated regularly as part of the four-year experience studies to ensure the assumptions are consistent with long-term expectations.

Historical Information

Monitoring certain information over time may help understand risks faced by the plan. Historical information is included throughout this report. Some examples are:

- Funded Ratio History shown in the Executive Summary illustrates how the plan's funded status (comparison of actuarial accrued liabilities to actuarial value of assets) has changed over time.
- Section 1.6 shows historical analysis of financial experience including how contribution rates have changed over time.
- Section 2.4 shows the volatility of asset returns over time.
- Section 4 includes various historical information showing how member census data has changed over time.

Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability (\$'s in \$000's)	June 30, 2019	June 30, 2020
1. Retiree and Beneficiary Accrued Liability	\$ 5,495,907	\$ 5,570,625
2. Total Accrued Liability	\$ 7,388,020	\$ 7,447,036
3. Ratio, (1) ÷ (2)	74.4%	74.8%

A high percentage of liability concentrated on participants in pay status indicates a mature plan (often a ratio above 60% - 65%). Because the plan was closed to new entrants in 2006, we expect the percentage in item #3 to continue to increase over time. An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption and increased costs. Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions creating an increased reliance on investment returns. This ratio should be monitored each year in the future.

Ratio of Cash Flow to Assets (\$'s in \$000's)	FYE June 30, 2019	FYE June 30, 2020
1. Contributions	\$ 199,933	\$ 207,899
2. Benefit Payments	<u>472,717</u>	<u>490,447</u>
3. Cash Flow, (1) - (2)	\$ (272,784)	\$ (282,548)
4. Fair Value of Assets	\$ 5,511,929	\$ 5,444,799
5. Ratio, (3) ÷ (4)	(4.9%)	(5.2%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the trust. Negative cash flow indicates the trust needs to rely on investment returns to cover benefit payments and / or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which can increase the investment risk. Currently, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. However, due to the plan being closed, we expect this measure to become increasingly negative over time. This maturity measure should be monitored in the future.

Contribution Volatility (\$'s in \$000's)	June 30, 2019	June 30, 2020
1. Fair Value of Assets	\$ 5,511,929	\$ 5,444,799
2. DB/DCR Payroll	\$ 725,659	\$ 741,090
3. Asset to Payroll Ratio, (1) ÷ (2)	759.6%	734.7%
4. Accrued Liability	\$ 7,388,020	\$ 7,447,036
5. Liability to Payroll Ratio, (4) ÷ (2)	1,018.1%	1,004.9%

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10% may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5%. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent, the plan with a liability-to-payroll ratio of 10% may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5%.

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 67 and 68

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013 and defines new financial reporting requirements for public pension plans.

Governmental Accounting Standards Board Statement Number 68 amends Number 27 effective for fiscal years beginning after June 15, 2014 and defines new accounting and financial reporting requirements for employers sponsoring public pension plans.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans. Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

DRAFT



State of Alaska

Public Employees' Retirement System Defined Contribution Retirement Plan

For Occupational Death and Disability
and Retiree Medical Benefits

Actuarial Valuation Report
As of June 30, 2020

January 2021

DRAFT



January 7, 2021

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Public Employees' Retirement System Defined Contribution Retirement (PERS DCR) Plan as of June 30, 2020 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2020. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under PERS DCR were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of PERS DCR as of June 30, 2020.

PERS DCR is funded by Employer Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board). The funding objective for PERS DCR is to pay required contributions that remain level as a percent of PERS DCR compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability as a level percent of PERS DCR compensation over closed layered 25-year periods. This objective is currently being met and is projected to continue to be met as required by the Alaska State statutes. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status is expected to remain at or above 100%.

The Board and staff of the State of Alaska may use this report for the review of the operations of PERS DCR. Use of this report, for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claims cost rates effective June 30, 2020 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 4.2 and 4.3.

Governmental Accounting Standards Board (GASB) Statement No. 74 (GASB 74) was effective for PERS DCR beginning with fiscal year ending June 30, 2017, and GASB 75 was effective beginning with fiscal year ending June 30, 2018. Separate GASB 74 and GASB 75 reports have been prepared.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the retiree medical portion of PERS DCR. We also believe ASOP 51 does not apply to the occupational death and disability portion of PERS DCR. Therefore, information related to ASOP 51 is not included in this report. However, it may be beneficial to review the ASOP 51 information provided in the PERS valuation report for information on risks that may also relate to the occupational death and disability benefits provided by this plan.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal model are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking

and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan, and to reflect the different Medicare coordination methods between the two plans. The manual rate models are intended to provide benchmark data and pricing capabilities, calculate per capita costs, and calculate actuarial values of different commercial health plans. Buck relied on the models, which were developed using industry data by actuaries and consultants at OptumInsight.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. A more detailed explanation on these adjustments is shown in Sections 4.2 and 4.3 and in the valuation report for the DB plan.

This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

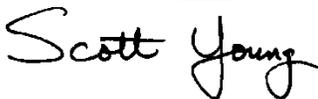
I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,



David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

Contents

Executive Summary	1
Section 1: Actuarial Funding Results	5
Section 1.1: Actuarial Liabilities and Normal Cost	5
Section 1.2: Actuarial Contributions as of June 30, 2020 for FY23	8
Section 1.3: Actuarial Gain/(Loss) for FY20	20
Section 1.4: History of Unfunded Liability and Funded Ratio	21
Section 2: Plan Assets	22
Section 2.1: Summary of Fair Value of Assets	22
Section 2.2: Changes in Fair Value of Assets During FY20	23
Section 2.3: Development of Actuarial Value of Assets	24
Section 2.4: Historical Asset Rates of Return	26
Section 3: Member Data	27
Section 3.1: Summary of Members Included	27
Section 3.2: Age and Service Distribution of Active Members	28
Section 3.3: Member Data Reconciliation	29
Section 3.4: Schedule of Active Member Data	30
Section 3.5: Active Member Payroll Reconciliation	31
Section 4: Basis of the Actuarial Valuation	32
Section 4.1: Summary of Plan Provisions	32
Section 4.2: Description of Actuarial Methods and Valuation Procedures	36
Section 4.3: Summary of Actuarial Assumptions	39
Glossary of Terms	50

Executive Summary

Overview

The State of Alaska Public Employees' Retirement System Defined Contribution Retirement (PERS DCR) Plan provides occupational death & disability and retiree medical benefits to eligible members hired after June 30, 2006 or who have elected participation in this plan. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of PERS DCR as of the valuation date of June 30, 2020.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of PERS DCR based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30 (\$'s in 000's)	2019	2020
Occupational Death & Disability		
a. Actuarial Accrued Liability	\$ 9,774	\$ 10,634
b. Valuation Assets	<u>36,701</u>	<u>43,029</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (26,927)	\$ (32,395)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	375.5%	404.6%
e. Fair Value of Assets	\$ 36,525	\$ 42,091
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	373.7%	395.8%

Funded Status as of June 30 (\$'s in 000's)	2019	2020
---	------	------

Retiree Medical

a. Actuarial Accrued Liability	\$ 124,946	\$ 150,701
b. Valuation Assets	<u>118,783</u>	<u>144,747</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 6,163	\$ 5,954
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	95.1%	96.0%
e. Fair Value of Assets	\$ 118,238	\$ 141,569
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	94.6%	93.9%

Total

a. Actuarial Accrued Liability	\$ 134,720	\$ 161,335
b. Valuation Assets	<u>155,484</u>	<u>187,776</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (20,764)	\$ (26,441)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	115.4%	116.4%
e. Fair Value of Assets	\$ 154,763	\$ 183,660
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	114.9%	113.8%

The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions so there is potential for actuarial gains or losses.

1. Investment Experience

The approximate FY20 investment return based on fair value of assets was 4.3% compared to the expected investment return of 7.38% (net of investment expenses of approximately 0.30%). This resulted in a loss of approximately \$5,003,000 to the plan from investment experience. The asset valuation method recognizes 20 percent of this loss (\$1,001,000) this year and an additional 20 percent in each of the next 4 years. In addition, 20 percent of the FY16 investment loss, 20 percent of the FY17 investment gain, 20 percent of the FY18 investment loss and 20 percent of the FY19 investment loss were recognized this year. The approximate FY20 asset return based on actuarial value of assets was 6.4% compared to the expected asset return of 7.38% (net of investment expenses).

2. Salary Increases

Salary increases for continuing active members during FY20 were higher than anticipated based on the valuation assumptions, resulting in a liability loss of approximately \$25,000.

3. Demographic Experience

The number of active members increased 4.7% from 21,902 at June 30, 2019 to 22,923 at June 30, 2020. The average age of active members increased from 40.96 to 41.21 and average credited service increased from 4.33 to 4.66 years.

The demographic experience gains/losses are shown on page 4.

4. Retiree Medical Claims Experience

Please refer to the State of Alaska Public Employees' Retirement System (PERS) Defined Benefit Plan Actuarial Valuation Report as of June 30, 2020 for a full description of the assumptions and costs of the retiree medical plan. Adjustments to these costs and assumptions are described in this report.

The recent claims experience described in Section 4.2 of this report (Section 5.2 of the PERS report) created an actuarial gain of approximately \$7,863,000. This gain included an update to the medical and prescription drug relative value factors (described in Section 4.1) this year. In addition, the 0.2% annual trend rate adjustment factor between the DB and DCR plans was removed, which resulted in an actuarial loss of approximately \$7,485,000.

5. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

6. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 4.2. The medical and prescription drug relative value factors were updated this year. In addition, the 0.2% annual trend rate adjustment factor between the DB and DCR plans was removed. The amounts included in Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

7. Changes in Benefit Provisions Since the Prior Valuation

There have been no changes in benefit provisions valued since the prior valuation.

Comparative Summary of Contribution Rates

Occupational Death & Disability	FY 2022	FY 2023
<u>Peace Officer/Firefighter</u>		
a. Employer Normal Cost Rate	0.68%	0.68%
b. Past Service Cost Rate	<u>(0.18)%</u>	<u>(0.19)%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.68%	0.68%
<u>Others</u>		
a. Employer Normal Cost Rate	0.31%	0.30%
b. Past Service Cost Rate	<u>(0.14)%</u>	<u>(0.16)%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.31%	0.30%
<u>Retiree Medical</u>		
a. Employer Normal Cost Rate	1.02%	1.05%
b. Past Service Cost Rate	<u>0.05%</u>	<u>0.05%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	1.07%	1.10%
<u>Total</u>		
<u>Peace Officer/Firefighter</u>		
a. Employer Normal Cost Rate	1.70%	1.73%
b. Past Service Cost Rate	<u>0.05%</u>	<u>0.05%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	1.75%	1.78%
<u>Others</u>		
a. Employer Normal Cost Rate	1.33%	1.35%
b. Past Service Cost Rate	<u>0.05%</u>	<u>0.05%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	1.38%	1.40%

The exhibit below shows the historical Board-adopted employer contribution rates for PERS DCR.

Total Employer Contribution Rate				
Valuation Date	Fiscal Year	Occupational Death & Disability (PF / Others)	Retiree Medical	Total (PF / Others)
June 30, 2008	FY11	1.18% / 0.31%	0.55%	1.73% / 0.86%
June 30, 2009	FY12	0.97% / 0.11%	0.51%	1.48% / 0.62%
June 30, 2010	FY13	0.99% / 0.14%	0.48%	1.47% / 0.62%
June 30, 2011	FY14	1.14% / 0.20%	0.48%	1.62% / 0.68%
June 30, 2012	FY15	1.06% / 0.22%	1.66%	2.72% / 1.88%
June 30, 2013	FY16	1.05% / 0.22%	1.68%	2.73% / 1.90%
June 30, 2014	FY17	0.49% / 0.17%	1.18%	1.67% / 1.35%
June 30, 2015	FY18	0.43% / 0.16%	1.03%	1.46% / 1.19%
June 30, 2016	FY19	0.76% / 0.26%	0.94%	1.70% / 1.20%
June 30, 2017	FY20	0.72% / 0.26%	1.32%	2.04% / 1.58%
June 30, 2018	FY21	0.70% / 0.31%	1.27%	1.97% / 1.58%
June 30, 2019	FY22	0.68% / 0.31%	1.07%	1.75% / 1.38%
June 30, 2020	FY23	TBD	TBD	TBD

Summary of Actuarial Accrued Liability Gain/(Loss)

The following table shows the FY20 gain/(loss) on actuarial accrued liability as of June 30, 2020 (\$'s in 000's):

	Occupational Death & Disability	Retiree Medical	Total
Retirement Experience	\$ 0	\$ 329	\$ 329
Termination Experience	(118)	985	867
Disability Experience	2,496	354	2,850
Active Mortality Experience	1,792	2	1,794
Inactive Mortality Experience	(17)	241	224
Salary Increases	(25)	N/A	(25)
New Entrants	(139)	(1,301)	(1,440)
Rehires	(36)	(3,327)	(3,363)
Per Capita Claims Costs	N/A	7,863	7,863
Elimination of 0.2% Annual Trend Rate Adjustment	N/A	(7,485)	(7,485)
Miscellaneous ¹	573	531	1,104
Total	\$ 4,526	\$ (1,808)	\$ 2,718

¹ Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories.

Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

Peace Officer / Firefighter

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	\$ 3,463	\$ 10
Occupational Disability Benefits	11,017	3,192
Medical and Prescription Drug Benefits	38,413	19,303
Medicare Part D Subsidy	<u>(6,709)</u>	<u>(3,402)</u>
Subtotal	\$ 46,184	\$ 19,103
Benefit Recipients		
Survivor Benefits	\$ 396	\$ 396
Disability Benefits	4,420	4,420
Medical and Prescription Drug Benefits	606	606
Medicare Part D Subsidy	<u>(93)</u>	<u>(93)</u>
Subtotal	\$ 5,329	\$ 5,329
Total	\$ 51,513	\$ 24,432
Total Occupational Death & Disability	\$ 19,296	\$ 8,018
Total Retiree Medical, Net of Part D Subsidy	\$ 32,217	\$ 16,414
Total Retiree Medical, Gross of Part D Subsidy	\$ 39,019	\$ 19,909

As of June 30, 2020	Normal Cost
Active Members	
Occupational Death Benefits	\$ 447
Occupational Disability Benefits	933
Medical and Prescription Drug Benefits	2,137
Medicare Part D Subsidy	<u>(372)</u>
Subtotal	\$ 3,145
Administrative Expense Load	
Occupational Death & Disability	\$ 0
Retiree Medical	<u>5</u>
Subtotal	\$ 5
Total	\$ 3,150
Total Occupational Death & Disability	\$ 1,380
Total Retiree Medical, Net of Part D Subsidy	\$ 1,770
Total Retiree Medical, Gross of Part D Subsidy	\$ 2,142

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

Others

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	\$ 8,675	\$ 579
Occupational Disability Benefits	15,388	1,421
Medical and Prescription Drug Benefits	261,701	161,739
Medicare Part D Subsidy	<u>(49,640)</u>	<u>(30,824)</u>
Subtotal	\$ 236,124	\$ 132,915
Benefit Recipients		
Survivor Benefits	\$ 0	\$ 0
Disability Benefits	616	616
Medical and Prescription Drug Benefits	4,176	4,176
Medicare Part D Subsidy	<u>(804)</u>	<u>(804)</u>
Subtotal	\$ 3,988	\$ 3,988
Total	\$ 240,112	\$ 136,903
Total Occupational Death & Disability	\$ 24,679	\$ 2,616
Total Retiree Medical, Net of Part D Subsidy	\$ 215,433	\$ 134,287
Total Retiree Medical, Gross of Part D Subsidy	\$ 265,877	\$ 165,915

As of June 30, 2020	Normal Cost
Active Members	
Occupational Death Benefits	\$ 1,379
Occupational Disability Benefits	2,374
Medical and Prescription Drug Benefits	16,512
Medicare Part D Subsidy	<u>(3,115)</u>
Subtotal	\$ 17,150
Administrative Expense Load	
Occupational Death & Disability	\$ 1
Retiree Medical	<u>15</u>
Subtotal	\$ 16
Total	\$ 17,166
Total Occupational Death & Disability	\$ 3,754
Total Retiree Medical, Net of Part D Subsidy	\$ 13,412
Total Retiree Medical, Gross of Part D Subsidy	\$ 16,527

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

All Members

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	\$ 12,138	\$ 589
Occupational Disability Benefits	26,405	4,613
Medical and Prescription Drug Benefits	300,114	181,042
Medicare Part D Subsidy	<u>(56,349)</u>	<u>(34,226)</u>
Subtotal	\$ 282,308	\$ 152,018
Benefit Recipients		
Survivor Benefits	\$ 396	\$ 396
Disability Benefits	5,036	5,036
Medical and Prescription Drug Benefits	4,782	4,782
Medicare Part D Subsidy	<u>(897)</u>	<u>(897)</u>
Subtotal	\$ 9,317	\$ 9,317
Total	\$ 291,625	\$ 161,335
Total Occupational Death & Disability	\$ 43,975	\$ 10,634
Total Retiree Medical, Net of Part D Subsidy	\$ 247,650	\$ 150,701
Total Retiree Medical, Gross of Part D Subsidy	\$ 304,896	\$ 185,824

As of June 30, 2020	Normal Cost
Active Members	
Occupational Death Benefits	\$ 1,826
Occupational Disability Benefits	3,307
Medical and Prescription Drug Benefits	18,649
Medicare Part D Subsidy	<u>(3,487)</u>
Subtotal	\$ 20,295
Administrative Expense Load	
Occupational Death & Disability	\$ 1
Retiree Medical	<u>20</u>
Subtotal	\$ 21
Total	\$ 20,316
Total Occupational Death & Disability	\$ 5,134
Total Retiree Medical, Net of Part D Subsidy	\$ 15,182
Total Retiree Medical, Gross of Part D Subsidy	\$ 18,669

Section 1.2: Actuarial Contributions as of June 30, 2020 for FY23 (\$'s in 000's)

Peace Officer / Firefighter

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 1,380	\$ 1,770	\$ 3,150
2. DCR Plan Rate Payroll Projected for FY21	203,314	203,314	203,314
3. Employer Normal Cost Rate, (1) ÷ (2)	0.68%	0.87%	1.55%
Past Service Rate			
1. Actuarial Accrued Liability	\$ 8,018	\$ 16,414	\$ 24,432
2. Valuation Assets	13,243	15,766	29,009
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ (5,225)	\$ 648	\$ (4,577)
4. Funded Ratio based on Valuation Assets	165.2%	96.1%	118.7%
5. Past Service Cost Amortization Payment	(391)	75	(316)
6. DCR Plan Rate Payroll Projected for FY21	203,314	203,314	203,314
7. Past Service Cost Rate, (5) ÷ (6)	(0.19%)	0.04%	(0.15%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.68%	0.91%	1.59%

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 1,380	\$ 1,770	\$ 3,150
2. Total DB and DCR Plan Rate Payroll Projected for FY21	362,869	362,869	362,869
3. Employer Normal Cost Rate, (1) ÷ (2)	0.38%	0.49%	0.87%
4. Past Service Cost Amortization Payment	(391)	75	(316)
5. Past Service Cost Rate, (4) ÷ (2)	(0.11%)	0.02%	(0.09%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.38%	0.51%	0.89%

Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Occupational Death & Disability (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (100)	\$ (97)	\$ (10)
FY08 Gain	06/30/2008	13	(586)	(574)	(57)
Change in Assumptions	06/30/2009	14	(104)	(104)	(10)
FY09 Loss	06/30/2009	14	446	445	42
Change in Assumptions	06/30/2010	15	79	79	7
FY10 Gain	06/30/2010	15	(282)	(286)	(25)
FY11 Loss	06/30/2011	16	73	71	6
FY12 Gain	06/30/2012	17	(349)	(359)	(29)
FY13 Gain	06/30/2013	18	(204)	(210)	(17)
Change in Assumptions	06/30/2014	19	(1,274)	(1,313)	(100)
PRPA Modification	06/30/2014	19	(91)	(93)	(7)
FY14 Gain	06/30/2014	19	(95)	(98)	(7)
FY15 Gain	06/30/2015	20	(664)	(682)	(50)
FY16 Loss	06/30/2016	21	4	4	0
FY17 Gain	06/30/2017	22	(525)	(534)	(37)
FY18 Gain	06/30/2018	23	(262)	(264)	(18)
Change in Assumptions	06/30/2018	23	(633)	(638)	(43)
FY19 Loss	06/30/2019	24	219	220	15
FY20 Gain	06/30/2020	25	(792)	(792)	(51)
Total				\$ (5,225)	\$ (391)

Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Retiree Medical (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (21)	\$ (23)	\$ (2)
Change in Assumptions	06/30/2008	13	17	16	2
FY08 Gain	06/30/2008	13	(62)	(61)	(6)
Change in Assumptions	06/30/2009	14	(8)	(8)	(1)
FY09 Gain	06/30/2009	14	(38)	(39)	(4)
Change in Assumptions	06/30/2010	15	41	41	4
FY10 Gain	06/30/2010	15	(46)	(43)	(4)
FY11 Loss	06/30/2011	16	70	69	6
Change in Assumptions	06/30/2012	17	3,085	3,166	259
FY12 Gain	06/30/2012	17	(273)	(279)	(23)
FY13 Loss	06/30/2013	18	880	906	71
Change in Assumptions	06/30/2014	19	(3,034)	(3,125)	(238)
FY14 Loss	06/30/2014	19	1,213	1,250	95
FY15 Gain	06/30/2015	20	(712)	(731)	(54)
EGWP Gain	06/30/2016	21	(1,675)	(1,715)	(122)
FY16 Loss	06/30/2016	21	1,116	1,144	82
Change in Assumptions	06/30/2017	22	2,244	2,281	158
FY17 Gain	06/30/2017	22	(50)	(52)	(4)
FY18 Gain	06/30/2018	23	(231)	(233)	(16)
Change in Assumptions	06/30/2018	23	(649)	(653)	(44)
FY19 Gain	06/30/2019	24	(1,291)	(1,297)	(86)
Change in Assumptions	06/30/2020	25	1,116	1,116	72
FY20 Gain	06/30/2020	25	(1,082)	(1,082)	(70)
Total				\$ 648	\$ 75

Peace Officer / Firefighter

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (121)	\$ (120)	\$ (12)
Change in Assumptions	06/30/2008	13	17	16	2
FY08 Gain	06/30/2008	13	(648)	(635)	(63)
Change in Assumptions	06/30/2009	14	(112)	(112)	(11)
FY09 Loss	06/30/2009	14	408	406	38
Change in Assumptions	06/30/2010	15	120	120	11
FY10 Gain	06/30/2010	15	(328)	(329)	(29)
FY11 Loss	06/30/2011	16	143	140	12
Change in Assumptions	06/30/2012	17	3,085	3,166	259
FY12 Gain	06/30/2012	17	(622)	(638)	(52)
FY13 Loss	06/30/2013	18	676	696	54
Change in Assumptions	06/30/2014	19	(4,308)	(4,438)	(338)
PRPA Modification	06/30/2014	19	(91)	(93)	(7)
FY14 Loss	06/30/2014	19	1,118	1,152	88
FY15 Gain	06/30/2015	20	(1,376)	(1,413)	(104)
EGWP Gain	06/30/2016	21	(1,675)	(1,715)	(122)
FY16 Loss	06/30/2016	21	1,120	1,148	82
Change in Assumptions	06/30/2017	22	2,244	2,281	158
FY17 Gain	06/30/2017	22	(575)	(586)	(41)
FY18 Gain	06/30/2018	23	(493)	(497)	(34)
Change in Assumptions	06/30/2018	23	(1,282)	(1,291)	(87)
FY19 Gain	06/30/2019	24	(1,072)	(1,077)	(71)
Change in Assumptions	06/30/2020	25	1,116	1,116	72
FY20 Gain	06/30/2020	25	(1,874)	(1,874)	(121)
Total				\$ (4,577)	\$ (316)

Section 1.2: Actuarial Contributions as of June 30, 2020 for FY23 (\$'s in 000's)

Others

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 3,754	\$ 13,412	\$ 17,166
2. DCR Plan Rate Payroll Projected for FY21	1,239,703	1,239,703	1,239,703
3. Employer Normal Cost Rate, (1) ÷ (2)	0.30%	1.08%	1.38%
Past Service Rate			
1. Actuarial Accrued Liability	\$ 2,616	\$ 134,287	\$ 136,903
2. Valuation Assets	29,786	128,981	158,767
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ (27,170)	\$ 5,306	\$ (21,864)
4. Funded Ratio based on Valuation Assets	1,138.6%	96.0%	116.0%
5. Past Service Cost Amortization Payment	(1,994)	675	(1,319)
6. DCR Plan Rate Payroll Projected for FY21	1,239,703	1,239,703	1,239,703
7. Past Service Cost Rate, (5) ÷ (6)	(0.16%)	0.05%	(0.11%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.30%	1.13%	1.43%

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 3,754	\$ 13,412	\$ 17,166
2. Total DB and DCR Plan Rate Payroll Projected for FY21	2,010,209	2,010,209	2,010,209
3. Employer Normal Cost Rate, (1) ÷ (2)	0.19%	0.66%	0.85%
4. Past Service Cost Amortization Payment	(1,994)	675	(1,319)
5. Past Service Cost Rate, (4) ÷ (2)	(0.10%)	0.03%	(0.07%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.19%	0.69%	0.88%

Others

Schedule of Past Service Cost Amortizations - Occupational Death & Disability (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (40)	\$ (39)	\$ (4)
FY08 Gain	06/30/2008	13	(318)	(313)	(31)
Change in Assumptions	06/30/2009	14	(92)	(91)	(8)
FY09 Gain	06/30/2009	14	(1,924)	(1,917)	(180)
Change in Assumptions	06/30/2010	15	24	25	2
FY10 Gain	06/30/2010	15	(994)	(1,004)	(90)
FY11 Gain	06/30/2011	16	(1,184)	(1,204)	(103)
FY12 Gain	06/30/2012	17	(1,233)	(1,264)	(104)
FY13 Gain	06/30/2013	18	(779)	(802)	(63)
Change in Assumptions	06/30/2014	19	(51)	(52)	(4)
PRPA Modification	06/30/2014	19	(27)	(28)	(2)
FY14 Gain	06/30/2014	19	(2,003)	(2,061)	(157)
FY15 Gain	06/30/2015	20	(1,850)	(1,900)	(140)
FY16 Gain	06/30/2016	21	(2,361)	(2,416)	(172)
FY17 Gain	06/30/2017	22	(2,377)	(2,415)	(168)
FY18 Gain	06/30/2018	23	(2,590)	(2,609)	(176)
Change in Assumptions	06/30/2018	23	(272)	(275)	(19)
FY19 Gain	06/30/2019	24	(3,984)	(4,002)	(265)
FY20 Gain	06/30/2020	25	(4,803)	(4,803)	(310)
Total				\$ (27,170)	\$ (1,994)

Others

Schedule of Past Service Cost Amortizations - Retiree Medical (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (335)	\$ (321)	\$ (34)
Change in Assumptions	06/30/2008	13	165	162	16
FY08 Gain	06/30/2008	13	(702)	(686)	(68)
Change in Assumptions	06/30/2009	14	(122)	(121)	(11)
FY09 Gain	06/30/2009	14	(438)	(436)	(40)
Change in Assumptions	06/30/2010	15	(572)	(577)	(52)
FY10 Loss	06/30/2010	15	579	580	52
FY11 Loss	06/30/2011	16	820	838	71
Change in Assumptions	06/30/2012	17	25,180	25,838	2,113
FY12 Loss	06/30/2012	17	1,451	1,487	122
FY13 Loss	06/30/2013	18	9,974	10,270	809
Change in Assumptions	06/30/2014	19	(21,822)	(22,478)	(1,708)
FY14 Loss	06/30/2014	19	7,002	7,213	548
FY15 Gain	06/30/2015	20	(8,726)	(8,970)	(660)
EGWP Gain	06/30/2016	21	(17,884)	(18,293)	(1,307)
FY16 Loss	06/30/2016	21	10,367	10,603	757
Change in Assumptions	06/30/2017	22	21,288	21,631	1,503
FY17 Gain	06/30/2017	22	(1,658)	(1,684)	(117)
FY18 Loss	06/30/2018	23	118	119	8
Change in Assumptions	06/30/2018	23	(8,993)	(9,060)	(613)
FY19 Gain	06/30/2019	24	(10,841)	(10,890)	(719)
Change in Assumptions	06/30/2020	25	6,369	6,369	411
FY20 Gain	06/30/2020	25	(6,288)	(6,288)	(406)
Total				\$ 5,306	\$ 675

Others

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (375)	\$ (360)	\$ (38)
Change in Assumptions	06/30/2008	13	165	162	16
FY08 Gain	06/30/2008	13	(1,020)	(999)	(99)
Change in Assumptions	06/30/2009	14	(214)	(212)	(19)
FY09 Gain	06/30/2009	14	(2,362)	(2,353)	(220)
Change in Assumptions	06/30/2010	15	(548)	(552)	(50)
FY10 Gain	06/30/2010	15	(415)	(424)	(38)
FY11 Gain	06/30/2011	16	(364)	(366)	(32)
Change in Assumptions	06/30/2012	17	25,180	25,838	2,113
FY12 Loss	06/30/2012	17	218	223	18
FY13 Loss	06/30/2013	18	9,195	9,468	746
Change in Assumptions	06/30/2014	19	(21,873)	(22,530)	(1,712)
PRPA Modification	06/30/2014	19	(27)	(28)	(2)
FY14 Loss	06/30/2014	19	4,999	5,152	391
FY15 Gain	06/30/2015	20	(10,576)	(10,870)	(800)
EGWP Gain	06/30/2016	21	(17,884)	(18,293)	(1,307)
FY16 Loss	06/30/2016	21	8,006	8,187	585
Change in Assumptions	06/30/2017	22	21,288	21,631	1,503
FY17 Gain	06/30/2017	22	(4,035)	(4,099)	(285)
FY18 Gain	06/30/2018	23	(2,472)	(2,490)	(168)
Change in Assumptions	06/30/2018	23	(9,265)	(9,335)	(632)
FY19 Gain	06/30/2019	24	(14,825)	(14,892)	(984)
Change in Assumptions	06/30/2020	25	6,369	6,369	411
FY20 Gain	06/30/2020	25	(11,091)	(11,091)	(716)
Total				\$ (21,864)	\$ (1,319)

Section 1.2: Actuarial Contributions as of June 30, 2020 for FY23 (\$'s in 000's)

All Members

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 5,134	\$ 15,182	\$ 20,316
2. DCR Plan Rate Payroll Projected for FY21	1,443,017	1,443,017	1,443,017
3. Employer Normal Cost Rate, (1) ÷ (2)	0.36%	1.05%	1.41%
Past Service Rate			
1. Actuarial Accrued Liability	\$ 10,634	\$ 150,701	\$ 161,335
2. Valuation Assets	43,029	144,747	187,776
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ (32,395)	\$ 5,954	\$ (26,441)
4. Funded Ratio based on Valuation Assets	404.6%	96.0%	116.4%
5. Past Service Cost Amortization Payment	(2,385)	750	(1,635)
6. DCR Plan Rate Payroll Projected for FY21	1,443,017	1,443,017	1,443,017
7. Past Service Cost Rate, (5) ÷ (6)	(0.17%)	0.05%	(0.12%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.36%	1.10%	1.46%

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 5,134	\$ 15,182	\$ 20,316
2. Total DB and DCR Plan Rate Payroll Projected for FY21	2,373,078	2,373,078	2,373,078
3. Employer Normal Cost Rate, (1) ÷ (2)	0.22%	0.64%	0.86%
4. Past Service Cost Amortization Payment	(2,385)	750	(1,635)
5. Past Service Cost Rate, (4) ÷ (2)	(0.10%)	0.03%	(0.07%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.22%	0.67%	0.89%

All Members

Schedule of Past Service Cost Amortizations - Occupational Death & Disability (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (140)	\$ (136)	\$ (14)
FY08 Gain	06/30/2008	13	(904)	(887)	(88)
Change in Assumptions	06/30/2009	14	(196)	(195)	(18)
FY09 Gain	06/30/2009	14	(1,478)	(1,472)	(138)
Change in Assumptions	06/30/2010	15	103	104	9
FY10 Gain	06/30/2010	15	(1,276)	(1,290)	(115)
FY11 Gain	06/30/2011	16	(1,111)	(1,133)	(97)
FY12 Gain	06/30/2012	17	(1,582)	(1,623)	(133)
FY13 Gain	06/30/2013	18	(983)	(1,012)	(80)
Change in Assumptions	06/30/2014	19	(1,325)	(1,365)	(104)
PRPA Modification	06/30/2014	19	(118)	(121)	(9)
FY14 Gain	06/30/2014	19	(2,098)	(2,159)	(164)
FY15 Gain	06/30/2015	20	(2,514)	(2,582)	(190)
FY16 Gain	06/30/2016	21	(2,357)	(2,412)	(172)
FY17 Gain	06/30/2017	22	(2,902)	(2,949)	(205)
FY18 Gain	06/30/2018	23	(2,852)	(2,873)	(194)
Change in Assumptions	06/30/2018	23	(905)	(913)	(62)
FY19 Gain	06/30/2019	24	(3,765)	(3,782)	(250)
FY20 Gain	06/30/2020	25	(5,595)	(5,595)	(361)
Total				\$ (32,395)	\$ (2,385)

All Members

Schedule of Past Service Cost Amortizations - Retiree Medical (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (356)	\$ (344)	\$ (36)
Change in Assumptions	06/30/2008	13	182	178	18
FY08 Gain	06/30/2008	13	(764)	(747)	(74)
Change in Assumptions	06/30/2009	14	(130)	(129)	(12)
FY09 Gain	06/30/2009	14	(476)	(475)	(44)
Change in Assumptions	06/30/2010	15	(531)	(536)	(48)
FY10 Loss	06/30/2010	15	533	537	48
FY11 Loss	06/30/2011	16	890	907	77
Change in Assumptions	06/30/2012	17	28,265	29,004	2,372
FY12 Loss	06/30/2012	17	1,178	1,208	99
FY13 Loss	06/30/2013	18	10,854	11,176	880
Change in Assumptions	06/30/2014	19	(24,856)	(25,603)	(1,946)
FY14 Loss	06/30/2014	19	8,215	8,463	643
FY15 Gain	06/30/2015	20	(9,438)	(9,701)	(714)
EGWP Gain	06/30/2016	21	(19,559)	(20,008)	(1,429)
FY16 Loss	06/30/2016	21	11,483	11,747	839
Change in Assumptions	06/30/2017	22	23,532	23,912	1,661
FY17 Gain	06/30/2017	22	(1,708)	(1,736)	(121)
FY18 Gain	06/30/2018	23	(113)	(114)	(8)
Change in Assumptions	06/30/2018	23	(9,642)	(9,713)	(657)
FY19 Gain	06/30/2019	24	(12,132)	(12,187)	(805)
Change in Assumptions	06/30/2020	25	7,485	7,485	483
FY20 Gain	06/30/2020	25	(7,370)	(7,370)	(476)
Total				\$ 5,954	\$ 750

All Members

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (496)	\$ (480)	\$ (50)
Change in Assumptions	06/30/2008	13	182	178	18
FY08 Gain	06/30/2008	13	(1,668)	(1,634)	(162)
Change in Assumptions	06/30/2009	14	(326)	(324)	(30)
FY09 Gain	06/30/2009	14	(1,954)	(1,947)	(182)
Change in Assumptions	06/30/2010	15	(428)	(432)	(39)
FY10 Gain	06/30/2010	15	(743)	(753)	(67)
FY11 Gain	06/30/2011	16	(221)	(226)	(20)
Change in Assumptions	06/30/2012	17	28,265	29,004	2,372
FY12 Gain	06/30/2012	17	(404)	(415)	(34)
FY13 Loss	06/30/2013	18	9,871	10,164	800
Change in Assumptions	06/30/2014	19	(26,181)	(26,968)	(2,050)
PRPA Modification	06/30/2014	19	(118)	(121)	(9)
FY14 Loss	06/30/2014	19	6,117	6,304	479
FY15 Gain	06/30/2015	20	(11,952)	(12,283)	(904)
EGWP Gain	06/30/2016	21	(19,559)	(20,008)	(1,429)
FY16 Loss	06/30/2016	21	9,126	9,335	667
Change in Assumptions	06/30/2017	22	23,532	23,912	1,661
FY17 Gain	06/30/2017	22	(4,610)	(4,685)	(326)
FY18 Gain	06/30/2018	23	(2,965)	(2,987)	(202)
Change in Assumptions	06/30/2018	23	(10,547)	(10,626)	(719)
FY19 Gain	06/30/2019	24	(15,897)	(15,969)	(1,055)
Change in Assumptions	06/30/2020	25	7,485	7,485	483
FY20 Gain	06/30/2020	25	(12,965)	(12,965)	(837)
Total				\$ (26,441)	\$ (1,635)

Section 1.3: Actuarial Gain/(Loss) for FY20 (\$'s in 000's)

	Occupational Death & Disability	Retiree Medical	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2019	\$ 9,774	\$ 124,946	\$ 134,720
b. Normal Cost	4,808	13,747	18,555
c. Interest on (a) and (b) at 7.38%	1,076	10,236	11,312
d. Employer Group Waiver Plan	0	34	34
e. Benefit Payments	(479)	(69)	(548)
f. Interest on (d) and (e) at 7.38%, adjusted for timing	(19)	(1)	(20)
g. Assumption/Method Changes	0	7,485	7,485
h. Expected Actuarial Accrued Liability as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g)	<u>\$ 15,160</u>	<u>\$ 156,378</u>	<u>\$ 171,538</u>
2. Actual Actuarial Accrued Liability as of June 30, 2020	<u>10,634</u>	<u>150,701</u>	<u>161,335</u>
3. Liability Gain/(Loss), (1)(h) - (2)	\$ 4,526	\$ 5,677	\$ 10,203
4. Expected Actuarial Asset Value			
a. Actuarial Asset Value as of June 30, 2019	\$ 36,701	\$ 118,783	\$ 155,484
b. Interest on (a) at 7.38%	2,709	8,766	11,475
c. Employer Contributions	4,387	17,846	22,233
d. Employer Group Waiver Plan	0	34	34
e. Interest on (c) and (d) at 7.38%, adjusted for timing	159	648	807
f. Benefit Payments	(479)	(69)	(548)
g. Administrative Expenses	0	(26)	(26)
h. Interest on (f) and (g) at 7.38%, adjusted for timing	(19)	(3)	(22)
i. Expected Actuarial Asset Value as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	<u>\$ 43,458</u>	<u>\$ 145,979</u>	<u>\$ 189,437</u>
5. Actuarial Asset Value as of June 30, 2020	<u>43,029</u>	<u>144,747</u>	<u>187,776</u>
6. Actuarial Asset Gain/(Loss), (5) - (4)(i)	\$ (429)	\$ (1,232)	\$ (1,661)
7. Total Actuarial Gain/(Loss), (3) + (6)	\$ 4,097	\$ 4,445	\$ 8,542
8. Contribution Gain/(Loss)	\$ 1,497	\$ 2,943	\$ 4,440
9. Administrative Expense Gain/(Loss)	\$ 1	\$ (18)	\$ (17)
10. FY20 Gain/(Loss), (7) + (8) + (9)	\$ 5,595	\$ 7,370	\$ 12,965

Section 1.4: History of Unfunded Liability and Funded Ratio (\$'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2007	\$ 759	\$ 1,255	165.3%	\$ (496)
June 30, 2008	2,018	4,007	198.6%	(1,989)
June 30, 2009	4,316	8,613	199.6%	(4,297)
June 30, 2010	8,038	13,568	168.8%	(5,530)
June 30, 2011	13,251	19,058	143.8%	(5,807)
June 30, 2012	46,921	24,915	53.1%	22,006
June 30, 2013	63,885	31,709	49.6%	32,176
June 30, 2014	53,844	41,461	77.0%	12,383
June 30, 2015	63,732	63,202	99.2%	530
June 30, 2016	77,052	87,027	112.9%	(9,975)
June 30, 2017	117,243	108,503	92.5%	8,740
June 30, 2018	126,311	131,058	103.8%	(4,747)
June 30, 2019	134,720	155,484	115.4%	(20,764)
June 30, 2020	161,335	187,776	116.4%	(26,441)

Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets (\$'s in 000's)

As of June 30, 2020	Occupational Death & Disability	Retiree Medical	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	\$ 534	\$ 1,868	\$ 2,402	1.3%
- Subtotal	\$ 534	\$ 1,868	\$ 2,402	1.3%
Fixed Income Investments				
- Domestic Fixed Income Pool	\$ 9,050	\$ 30,391	\$ 39,441	21.6%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	\$ 9,050	\$ 30,391	\$ 39,441	21.6%
Equity Investments				
- Domestic Equity Pool	\$ 11,402	\$ 38,291	\$ 49,693	27.2%
- International Equity Pool	6,506	21,849	28,355	15.5%
- Private Equity Pool	5,159	17,326	22,485	12.3%
- Emerging Markets Equity Pool	1,361	4,569	5,930	3.3%
- Alternative Equity Strategies	2,269	7,622	9,891	5.4%
- Subtotal	\$ 26,697	\$ 89,657	\$ 116,354	63.7%
Other Investments				
- Real Estate Pool	\$ 2,573	\$ 8,642	\$ 11,215	6.1%
- Other Investments Pool	3,074	10,324	13,398	7.3%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	0	0	0.0%
- Subtotal	\$ 5,647	\$ 18,966	\$ 24,613	13.4%
Total Cash and Investments	\$ 41,928	\$ 140,882	\$ 182,810	100.0%
Net Accrued Receivables	163	687	850	
Net Assets	\$ 42,091	\$ 141,569	\$ 183,660	
Peace Officer / Firefighter	\$ 12,954	N/A	N/A	
Others	29,137	N/A	N/A	
All Members	\$ 42,091	\$ 141,569	\$ 183,660	

Section 2.2: Changes in Fair Value of Assets During FY20 (\$'s in 000's)

Fiscal Year 2020	Occupational Death & Disability	Retiree Medical	Total
1. Fair Value of Assets as of June 30, 2019	\$ 36,525	\$ 118,238	\$ 154,763
2. Additions:			
a. Member Contributions	\$ 0	\$ 0	\$ 0
b. Employer Contributions	4,387	17,846	22,233
c. Interest and Dividend Income	591	1,944	2,535
d. Net Appreciation/(Depreciation) in Fair Value of Investments	1,176	3,961	5,137
e. Employer Group Waiver Plan	0	34	34
f. Other	0	0	0
g. Total Additions	\$ 6,154	\$ 23,785	\$ 29,939
3. Deductions:			
a. Medical Benefits	\$ 0	\$ 69	\$ 69
b. Death & Disability Benefits	479	0	479
c. Investment Expenses	109	359	468
d. Administrative Expenses	0	26	26
e. Total Deductions	\$ 588	\$ 454	\$ 1,042
4. Fair Value of Assets as of June 30, 2020	\$ 42,091	\$ 141,569	\$ 183,660
5. Approximate Fair Value Investment Return Rate during FY20 Net of Investment Expenses	4.3%	4.4%	4.3%

Section 2.3: Development of Actuarial Value of Assets (\$'s in 000's)

The actuarial value of assets and the fair value were \$0 at June 30, 2006. Investment gains and losses are recognized 20% per year over 5 years. In no event may valuation assets be less than 80% or more than 120% of fair value as of the current valuation date.

	Occupational Death & Disability	Retiree Medical	Total
1. Investment Gain/(Loss) for FY20			
a. Fair Value as of June 30, 2019	\$ 36,525	\$ 118,238	\$ 154,763
b. Contributions	4,387	17,846	22,233
c. Employer Group Waiver Plan	0	34	34
d. Benefit Payments	479	69	548
e. Administrative Expenses	0	26	26
f. Actual Investment Return (net of investment expenses)	1,658	5,546	7,204
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return	2,836	9,371	12,207
i. Investment Gain/(Loss) for the Year (f) - (h)	(1,178)	(3,825)	(5,003)
2. Actuarial Value as of June 30, 2020			
a. Fair Value as of June 30, 2020	\$ 42,091	\$ 141,569	\$ 183,660
b. Deferred Investment Gain/(Loss)	(938)	(3,178)	(4,116)
c. Preliminary Actuarial Value as of June 30, 2020, (a) - (b)	43,029	144,747	187,776
d. Upper Limit: 120% of Fair Value as of June 30, 2020	50,509	169,882	220,391
e. Lower Limit: 80% of Fair Value as of June 30, 2020	33,673	113,256	146,929
f. Actuarial Value at June 30, 2020, (c) limited by (d) and (e)	43,029	144,747	187,776
3. Ratio of Actuarial Value of Assets to Fair Value of Assets			
	102.2%	102.2%	102.2%
4. Approximate Actuarial Value Investment Return Rate during FY20 Net of Investment Expenses			
	6.3%	6.4%	6.4%
5. Actuarial Value Allocation ¹			
a. Peace Officer / Firefighter	\$ 13,243	\$ 15,766	\$ 29,009
b. Others	29,786	128,981	158,767
c. All Members	\$ 43,029	\$ 144,747	\$ 187,776

¹ Occupational death & disability allocated using fair value of assets. Retiree medical allocated based on retiree medical actuarial accrued liability.

The tables below show the development of the gains/(losses) to be recognized in the current year (\$'s in 000's):

Occupational Death & Disability				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (1,649)	\$ (1,320)	\$ (329)	\$ 0
June 30, 2017	1,090	654	218	218
June 30, 2018	23	10	5	8
June 30, 2019	(370)	(74)	(74)	(222)
June 30, 2020	<u>(1,178)</u>	<u>0</u>	<u>(236)</u>	<u>(942)</u>
Total	\$ (2,084)	\$ (730)	\$ (416)	\$ (938)

Retiree Medical				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (4,028)	\$ (3,224)	\$ (804)	\$ 0
June 30, 2017	3,156	1,893	631	632
June 30, 2018	(58)	(24)	(12)	(22)
June 30, 2019	(1,212)	(242)	(242)	(728)
June 30, 2020	<u>(3,825)</u>	<u>0</u>	<u>(765)</u>	<u>(3,060)</u>
Total	\$ (5,967)	\$ (1,597)	\$ (1,192)	\$ (3,178)

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (5,677)	\$ (4,544)	\$ (1,133)	\$ 0
June 30, 2017	4,246	2,547	849	850
June 30, 2018	(35)	(14)	(7)	(14)
June 30, 2019	(1,582)	(316)	(316)	(950)
June 30, 2020	<u>(5,003)</u>	<u>0</u>	<u>(1,001)</u>	<u>(4,002)</u>
Total	\$ (8,051)	\$ (2,327)	\$ (1,608)	\$ (4,116)

Section 2.4: Historical Asset Rates of Return

Year Ending	Actuarial Value		Fair Value	
	Annual	Cumulative*	Annual	Cumulative*
June 30, 2008	5.0%	5.0%	(7.1%)	(7.1%)
June 30, 2009	2.4%	3.7%	(13.0%)	(10.1%)
June 30, 2010	3.9%	3.8%	6.6%	(4.8%)
June 30, 2011	7.3%	4.6%	19.2%	0.7%
June 30, 2012	6.9%	5.1%	2.0%	0.9%
June 30, 2013	7.9%	5.5%	11.8%	2.7%
June 30, 2014	10.9%	6.3%	18.0%	4.7%
June 30, 2015	9.5%	6.7%	3.3%	4.6%
June 30, 2016	6.7%	6.7%	0.2%	4.1%
June 30, 2017	7.8%	6.8%	12.6%	4.9%
June 30, 2018	7.9%	6.9%	7.9%	5.2%
June 30, 2019	6.6%	6.9%	6.2%	5.2%
June 30, 2020	6.4%	6.8%	4.3%	5.2%

* Cumulative since fiscal year ending June 30, 2008

Section 3: Member Data

Section 3.1: Summary of Members Included

As of June 30	2016	2017	2018	2019	2020
Active Members - Peace Officer / Firefighter					
1. Number	1,605	1,701	1,905	2,038	2,228 ¹
2. Average Age	35.17	35.59	35.63	35.76	35.92
3. Average Credited Service	4.12	4.65	4.83	5.09	5.36
4. Average Entry Age	31.05	30.94	30.80	30.67	30.56
5. Average Annual Earnings	\$ 76,213	\$ 77,800	\$ 78,603	\$ 84,593	\$ 87,365
Active Members - Others					
1. Number	16,610	17,470	18,473	19,864	20,695 ²
2. Average Age	40.90	41.22	41.34	41.49	41.78
3. Average Credited Service	3.51	3.83	4.08	4.25	4.59
4. Average Entry Age	37.39	37.39	37.26	37.24	37.19
5. Average Annual Earnings	\$ 55,335	\$ 56,100	\$ 57,349	\$ 58,223	\$ 59,603
Active Members - Total					
1. Number	18,215	19,171	20,378	21,902	22,923 ³
2. Average Age	40.39	40.72	40.80	40.96	41.21
3. Average Credited Service	3.56	3.90	4.15	4.33	4.66
4. Average Entry Age	36.83	36.82	36.65	36.63	36.55
5. Average Annual Earnings	\$ 57,175	\$ 58,025	\$ 59,336	\$ 60,676	\$ 62,302
Disabilitants and Beneficiaries (Occupational Death & Disability)					
1. Number	12	14	15	16	15
2. Average Age	44.19	42.37	43.66	42.28	44.66
3. Average Monthly Death & Disability Benefit	\$ 2,442	\$ 2,199	\$ 2,285	\$ 2,404	\$ 2,698
Retirees, Surviving Spouses, and Dependent Spouses (Retiree Medical)					
1. Number	0	9	23	43	66
2. Average Age	N/A	70.76	69.97	69.72	68.85
Total Number of Members	18,227	19,194	20,416	21,961	23,004

Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

¹ Includes 1,851 male active members and 377 female active members.

² Includes 8,840 male active members and 11,855 female active members.

³ Includes 10,691 male active members and 12,232 female active members.

Section 3.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	91	\$ 3,621,900	\$ 39,801
20 - 24	1,197	56,027,881	46,807
25 - 29	3,079	174,465,728	56,663
30 - 34	3,905	245,016,855	62,744
35 - 39	3,639	241,473,524	66,357
40 - 44	2,865	190,250,153	66,405
45 - 49	2,442	154,441,003	63,244
50 - 54	2,061	129,385,144	62,778
55 - 59	1,852	118,234,931	63,842
60 - 64	1,250	80,198,279	64,159
65 - 69	410	27,487,967	67,044
70 - 74	104	6,117,074	58,818
75+	28	1,419,946	50,712

Total 22,923 \$1,428,140,385 \$ 62,302

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	3,822	\$ 184,241,494	\$ 48,206
1	3,499	186,233,418	53,225
2	2,666	151,093,642	56,674
3	2,021	123,050,379	60,886
4	1,774	112,245,646	63,273
0 - 4	13,782	\$ 756,864,579	\$ 54,917
5 - 9	6,598	465,544,939	70,558
10 - 14	2,540	205,456,631	80,888
15 - 19	3	274,236	91,412
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40+	0	0	0

Total 22,923 \$1,428,140,385 \$ 62,302

Years of Credited Service by Age

Age	Years of Service										Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+		
0 - 19	91	0	0	0	0	0	0	0	0	0	91
20 - 24	1,187	10	0	0	0	0	0	0	0	0	1,197
25 - 29	2,638	436	5	0	0	0	0	0	0	0	3,079
30 - 34	2,494	1,202	209	0	0	0	0	0	0	0	3,905
35 - 39	1,937	1,189	513	0	0	0	0	0	0	0	3,639
40 - 44	1,513	886	465	1	0	0	0	0	0	0	2,865
45 - 49	1,292	787	362	1	0	0	0	0	0	0	2,442
50 - 54	1,016	735	310	0	0	0	0	0	0	0	2,061
55 - 59	842	672	338	0	0	0	0	0	0	0	1,852
60 - 64	560	460	229	1	0	0	0	0	0	0	1,250
65 - 69	149	175	86	0	0	0	0	0	0	0	410
70 - 74	49	33	22	0	0	0	0	0	0	0	104
75+	14	13	1	0	0	0	0	0	0	0	28
Total	13,782	6,598	2,540	3	0	0	0	0	0	0	22,923

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 3.3: Member Data Reconciliation

	Actives	Retirees and Surviving Spouses	Dependent Spouses	OD&D Disabilitants	OD&D Beneficiaries	Total
As of June 30, 2019 ¹	21,902	34	9	12	4	21,961
New Entrants	3,599	0	0	0	0	3,599
Rehires	618	0	0	0	0	618
Vested Terminations	(557)	0	0	0	0	(557)
Non-Vested Terminations	(1,968)	0	0	0	0	(1,968)
Refund of Contributions	(609)	0	0	0	0	(609)
Disability Retirements	(1)	0	0	1	0	0
Age Retirements	(17)	17	6	0	0	6
Deaths With Beneficiary	0	0	0	0	0	0
Deaths Without Beneficiary	(22)	(4)	0	0	0	(26)
Converted To/From DB Plan	0	0	0	0	0	0
Added Dependent Coverage	0	0	1	0	0	1
Dropped Dependent Coverage	0	0	0	0	0	0
Transfers In/Out	(19)	3	0	0	0	(16)
Data Corrections	(3)	0	0	0	(2)	(5)
Net Change	1,021	16	7	1	(2)	1,043
As of June 30, 2020 ²	22,923	50	16	13	2	23,004

¹ 101 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

² 114 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

Section 3.4: Schedule of Active Member Data

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2020	22,923	\$ 1,428,140	\$ 62,302	2.7%	153
June 30, 2019	21,902	1,328,934	60,676	2.3%	155
June 30, 2018	20,378	1,209,152	59,336	2.3%	155
June 30, 2017	19,171	1,112,398	58,025	1.5%	157
June 30, 2016	18,215	1,041,437	57,175	3.4%	157
June 30, 2015	17,098	945,496	55,299	1.9%	159
June 30, 2014	15,800	857,150	54,250	3.7%	159
June 30, 2013	14,316	748,658	52,295	4.7%	159
June 30, 2012	12,597	629,128	49,943	4.5%	160
June 30, 2011	10,965	524,088	47,796	4.8%	160

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 3.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY20 in employer list	\$ 1,320,368
b) DRB actual reported salaries FY20 in valuation data	1,275,698
c) Annualized valuation data	1,428,140
d) Valuation payroll as of June 30, 2020	1,500,403
e) Rate payroll for FY21	1,443,017

- a) Actual reported salaries from DRB employer listing showing all payroll paid during FY20, including those who were not active as of June 30, 2020
- b) Payroll from valuation data for people who are in active status as of June 30, 2020
- c) Payroll from (b) annualized for both new entrants and part-timers
- d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
- e) Payroll from (d) with the part-timer annualization removed

Section 4: Basis of the Actuarial Valuation

Section 4.1: Summary of Plan Provisions

Effective Date

July 1, 2006, with amendments through June 30, 2020.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the Plan. The Attorney General of the state is the legal counsel for the Plan and shall advise the administrator and represent the Plan in legal proceedings.

The Alaska Retirement Management Board prescribes policies, adopts regulations, invests the funds, and performs other activities necessary to carry out the provisions of the Plan.

Employers Included

Currently there are 155 employers participating in PERS DCR, including the State of Alaska, and 154 political subdivisions and public organizations.

Membership

An employee of a participating employer who first enters service on or after July 1, 2006, or a member of the defined benefit plan who works for an employer who began participation on or after July 1, 2006, and meets the following criteria is a member in the Plan:

- Permanent full-time or part-time employees of the State of Alaska, participating political subdivisions or public organizations. An employee must be regularly scheduled to work 30 or more hours per week to be considered full-time by the PERS. An employee must be regularly scheduled to work 15 or more hours per week but less than 30 hours to be considered a part-time employee for PERS purposes.
- Elected state officials.
- Elected municipal officials who are compensated and receive at least \$2,001.00 per month.

Members can convert to PERS DCR if they are an eligible non-vested member of the PERS defined benefit plan whose employer consents to transfers to the defined contribution plan and they elect to transfer his or her account balance to PERS DCR.

Member Contributions

Other than the member-paid premiums discussed later in this section, there are no member contributions for the occupational death & disability and retiree medical benefits.

Retiree Medical Benefits

- Member must retire directly from the plan to be eligible for retiree medical coverage. Normal retirement eligibility is the earlier of a) 25 years of service as a peace officer or firefighter and 30 years of service for any other employee or b) Medicare eligible and 10 years of service.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's and any covered dependent's premium is 100% until the member is Medicare eligible. Upon the member's Medicare-eligibility, the required contribution will follow the service-based schedule shown below.
- Coverage cannot be denied except for failure to pay premium.
- Members who are receiving disability benefits or survivors who are receiving monthly survivor benefits are not eligible until the member meets, or would have met if he/she had lived, the normal retirement eligibility requirements.
- The following is a summary of the medical benefit design adopted in July 2016. The plan description below is used for valuation purposes and indicates participant cost-sharing. Please refer to the benefit handbook for more details.

Plan Design Feature	In-Network ¹	Out-of-Network ^{1 2}
Deductible (single / family)	\$300 / \$600	
Medical services (participant share)	20%	40%
Emergency Room Copay (non-emergent use)	\$100	\$100
Medical Out-of-Pocket Maximum (single / family, including deductible)	\$1,500 / \$3,000	\$3,000 / \$6,000
Medicare Coordination	Exclusion	Exclusion
Pharmacy	No Deductible	No Deductible
Retail Generic (per 30-day fill)	20% \$10 min / \$50 max	
Retail Non-Formulary Brand (per 30-day fill)	25% \$25 min / \$75 max	40%
Retail Formulary Brand (per 30-day fill)	35% \$80 min / \$150 max	
Mail-Order Generic	\$20 copay	
Mail-Order Non-Formulary Brand	\$50 copay	40%
Mail-Order Formulary Brand	\$100 copay	
Pharmacy Out-of-Pocket Max (single / family)	\$1,000 / \$2,000	
Medicare Pharmacy Arrangement	Retiree Drug Subsidy / Employer Group Waiver Plan effective 1/1/2019	
Wellness / Preventative	100% covered, not subject to deductible	20%, after deductible

¹ Section 1.1 of the AlaskaCare Defined Contribution Retiree Benefit Plan states that this health plan shall be updated from time to time to reflect changes in benefits, including annual adjustments to the premium, deductible, coinsurance, medical out-of-pocket limit, and prescription drug out-of-pocket limit.

² OON applies only to non-Medicare eligible participants.

- Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan outlined above. We applied the ratio of the DCR retiree medical plan value to the DB retiree medical plan value to the per capita costs determined for each of pre/post-Medicare medical and pharmacy benefits to estimate corresponding values for the DCR retiree medical plan design. These factors are noted in Section 4.3. We further adjusted the Medicare medical manual rate to reflect the Medicare coordination method adopted. The estimated 2021 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates). We reflect estimated discounts and pharmacy rebates in the defined benefit medical cost so no further adjustment was needed for the DCR retiree medical plan. The medical network differential is reflected in the relative plan value adjustments.
- The retiree medical plan’s coverage is supplemental to Medicare. Medicare coordination is described in the 2020 DCR Plan Handbook, referred to in the industry as exclusion coordination: Medicare payment is deducted from the Medicare allowable expense and plan parameters are applied to the remaining amount. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.
- The premium for Medicare-eligible retirees will be based on the member’s years of service. The percentage of premium paid by the member is as follows:

Years of Service	Percent of Premium Paid by Member
< 15	30%
15 – 19	25%
20 – 24	20%
25 – 29	15%
30+	10%

- The premium for dependents who are not eligible for Medicare aligns with the member’s subsidy. While a member is not Medicare-eligible, premiums are 100% of the estimated cost.
- Members have a separate defined contribution Health Reimbursement Arrangement account, which is not reflected in this valuation, that can be used to pay for premiums or other medical expenses.
- For valuation purposes, retiree premiums were assumed to equal the percentages outlined in the table above times the age-related plan costs. Future premiums calculated and charged to DCR participants will need to be determined reflecting any appropriate adjustments to the defined benefit (DB) plan data because current DB premiums were determined using information based upon enrollment with members who have double coverage.
- Coverage will continue for surviving spouses of covered retired members.

Occupational Disability Benefits

- Benefit is 40% of salary at date of disability.
- For Peace Officer and Firefighters there is a Disability Benefit Adjustment such that:
 - The disability benefit is increased by 75% of the cost of living increase in the preceding calendar year or 9%, whichever is less.
 - At the time the disabled member retires, the retirement benefit will be increased by a percentage equal to the total cumulative percentage that has been applied to the disability benefit. Monthly annuity payments are made from the member's contribution balance until the fund is exhausted, at which the plan pays all remaining payments.
- For Others, there is no increase in the occupational disability benefit after commencement.
- Member earns service while on occupational disability.
- Benefits cease when the member becomes eligible for normal retirement at Medicare-eligible age and 10 years of service, or at any age with 30 years of service for Others members or 25 years of service for Peace Officer/Firefighter members.
- Peace Officer/Firefighter members may select the defined contribution account or the monthly benefit payable as if they were retiring under Tier 3 (service continues during disability, final average salary is as of date of disability), but with payments first made from the member's DC account until it's exhausted.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's premium is 100% of the estimated cost until they are Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Occupational Death Benefits

- Benefit is 40% of salary for Others members and 50% of salary for Peace Officer/Firefighter members.
- Survivor's Pension Adjustment: A survivor's pension is increased by 50% of the cost of living increase in the preceding calendar year or 6%, whichever is less, if the recipient is at least age 60 on July 1, or under age 60 if the recipient has been receiving PERS benefits for at least 5 years as of July 1.
- Benefits cease when the member would have become eligible for normal retirement.
- The period during which the survivor is receiving benefits is counted as service credit toward retiree medical benefits.
- No subsidized retiree medical benefits are provided until the member would have been eligible for normal retirement. The surviving spouse's premium is 100% of the estimated cost until the member would have been Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Changes Since the Prior Valuation

There have been no changes in PERS DCR benefit provisions valued since the prior valuation.

Section 4.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006, and was modified as part of the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was implemented effective June 30, 2006.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay. Each year's difference between actual and expected unfunded actuarial accrued liability is amortized over 25 years as a level percentage of expected payroll.

Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year for death and disability benefits and retiree medical benefits, from the assumed entry age to the last age with a future benefit were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total DCR Plan payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for beneficiaries and disabled members currently receiving benefits (if any) was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

Valuation of Assets

Effective June 30, 2006, the asset valuation method recognizes 20% of the investment gain or loss in each of the current and preceding four years. This method was phased in over five years. Fair Value of Assets was \$0 as of June 30, 2006. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP. Valuation assets are constrained to a range of 80% to 120% of the fair value of assets.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

The methodology used for the valuation of the retiree medical benefits is described in Section 5.2 of the State of Alaska Public Employees' Retirement System Defined Benefit Plan Actuarial Valuation Report as of June 30, 2020.

Due to the lack of experience for the DCR retiree medical plan only, base claims costs are based on those described in the actuarial valuation as of June 30, 2020 for the Defined Benefit (DB) retiree medical plan covering TRS and PERS. The DB rates were used with some adjustments. The claims costs were adjusted to reflect the differences between the DCR medical plan and the DB medical plan. These differences include network steerage, different coverage levels, different Medicare coordination for medical benefits, and an indexing of the retiree out-of-pocket dollar amounts. To account for higher initial copays, deductibles and out-of-pocket limits, projected FY21 claims costs were reduced 3.1% for medical claims, and 8.9% for prescription drugs. In addition, to account for the difference in Medicare coordination, projected FY21 medical claims costs for Medicare eligible retirees were further reduced 29.5%.

FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19.

No implicit subsidies are assumed. Employees projected to retire with 30 years of service (25 years of service for Peace/Fire) prior to Medicare are valued with commencement deferred to Medicare eligibility because those members will be required to pay the full plan premium prior to Medicare. Explicit subsidies for disabled and normal retirement are determined using the plan-defined percentages of age-related total projected plan costs, again with no implicit subsidy assumed.

The State transitioned to an Employer Group Waiver Program (EGWP) for DCR participants effective January 1, 2019. The estimated 2021 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates).

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, not all provisions are required. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. The adopted DCR plan does not place lifetime limits on benefits, but does restrict dependent child coverage.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

DRAFT

Section 4.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2020 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

100% (male and female) of RP-2014 employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

91% of male and 96% of female rates of RP-2014 healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Tables 2a and 2b).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Disabilities are assumed to be occupational 75% of the time for Peace Officer/Firefighters, and 40% of the time for Others. For Peace Officer/Firefighters, members are assumed to take the monthly annuity 100% of the time.

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Retirement

Retirement rates based upon the 2013-2017 actual experience (see Table 4).

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Occupational Death & Disability

For Others, 75% of male members and 70% of female members are assumed to be married. For Peace Officer/Firefighters, 85% of male members and 60% of female members are assumed to be married.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. For Others, 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse. For Peace Officer/Firefighters, 75% of male members and 50% of female members are assumed to be married and cover a dependent spouse.

Part-Time Status

Part-time employees are assumed to earn 1.00 years of credited service per year for Peace Officer/Firefighter and 0.75 years of credited service per year for Other members.

Peace Officer / Firefighter Occupational Disability Retirement Benefit Commencement

The occupational disability retirement benefit is assumed to be first payable from the member's DC account and the retirement benefit payable from the occupational death and disability trust will commence five years later.

Per Capita Claims Cost

Sample claims cost rates (before base claims cost adjustments described below) adjusted to age 65 for FY21 medical and prescription drugs are shown below:

	Medical	Prescription Drugs
Pre-Medicare	\$ 15,360	\$ 3,393
Medicare Parts A & B	\$ 1,618	\$ 3,340
Medicare Part D – EGWP	N/A	\$ 1,003

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2021 fiscal year (July 1, 2020 – June 30, 2021).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

\$449 per person per year; assumed to increase at 4.5% per year.

Base Claims Cost Adjustments

Due to higher initial copays, deductibles, out-of-pocket limits and member cost sharing compared to the DB medical plan, the following cost adjustments are applied to the per capita claims cost rates above:

- 0.969 for the pre-Medicare plan.
- 0.674 for both the Medicare medical plan and Medicare coordination method (3.1% reduction for the medical plan and 29.5% reduction for the coordination method).
- 0.911 for the prescription drug plan.

Administrative Expenses

Beginning with the June 30, 2018 valuation, the Normal Cost is increased for administrative expenses expected to be paid from plan assets during the year. The amounts included in the June 30, 2020 Normal Cost, which are based on the average of actual administrative expenses during the last two fiscal years, are \$1,000 for occupational death & disability and \$20,000 for retiree medical.

Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.5% is applied to the FY21 pre-Medicare medical claims costs to get the FY22 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY21	6.5%	5.4%	7.5%
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retiree Medical Participation

Decrement Due to Disability		Decrement Due to Retirement	
Age	Percent Participation	Age	Percent Participation*
< 56	75.0%	55	50.0%
56	77.5%	56	55.0%
57	80.0%	57	60.0%
58	82.5%	58	65.0%
59	85.0%	59	70.0%
60	87.5%	60	75.0%
61	90.0%	61	80.0%
62	92.5%	62	85.0%
63	95.0%	63	90.0%
64	97.5%	64	95.0%
65+	100.0%	65+	Years of Service
			< 15 75.0%
			15 – 19 80.0%
			20 – 24 85.0%
			25 – 29 90.0%
			30+ 95.0%

* Participation assumption is a combination of (i) the service-based rates for retirement from employment at age 65+ and (ii) the age-based rates for retirement from employment before age 65. These rates reflect the expected plan election rate that varies by reason for decrement, duration that a member may pay full cost prior to Medicare eligibility, and availability of alternative and/or lower cost options, particularly in the Medicare market. This assumption is based on observed trends in participation from a range of other plans.

Imputed Data

Data changes from the prior year which are deemed to have immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Changes in Assumptions Since the Prior Valuation

The amounts included in the Normal Cost for administrative expenses were changed from \$600 to \$1,000 for occupational death & disability, and from \$8,750 to \$20,000 for retiree medical (based on the most recent two years of actual administrative expenses paid from plan assets). The per capita claims cost assumption is updated annually. The medical and prescription drug relative value factors were updated and the 0.2% annual trend rate adjustment factor between the DB and DCR plans was removed.

Table 1: Salary Scales

Peace Officer / Firefighter		Others	
Years of Service	Percent Increase	Years of Service	Percent Increase
0	7.75%	0	6.75%
1	7.25%	1	6.25%
2	6.75%	2	5.75%
3	6.25%	3	5.25%
4	5.75%	4	4.75%
5	5.25%	5	4.25%
6	4.75%	6	3.75%
7	4.25%	7	3.65%
8	3.75%	8	3.55%
9	3.65%	9	3.45%
10	3.55%	10	3.35%
11	3.45%	11	3.25%
12	3.35%	12	3.15%
13	3.25%	13	3.05%
14	3.15%	14	2.95%
15	3.05%	15	2.85%
16	2.95%	16	2.75%
17	2.85%	17	2.75%
18+	2.75%	18+	2.75%

Table 2a: Turnover Rates for Peace Officer / Firefighter

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	18.90%	20.63%
1	14.18%	16.50%
2	10.50%	13.75%
3	9.45%	12.38%
4	8.40%	11.00%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	5.52%	11.97%	44	5.78%	11.09%
23	5.65%	11.97%	45	5.71%	11.03%
24	5.78%	11.97%	46	5.64%	10.98%
25	5.91%	11.97%	47	5.57%	10.92%
26	6.04%	11.97%	48	6.01%	10.84%
27	6.16%	11.97%	49	6.45%	10.75%
28	6.16%	11.94%	50	6.89%	10.67%
29	6.15%	11.91%	51	7.32%	10.58%
30	6.14%	11.88%	52	7.76%	10.50%
31	6.14%	11.84%	53	7.97%	10.66%
32	6.12%	11.81%	54	8.18%	10.82%
33	6.11%	11.79%	55	8.38%	10.98%
34	6.09%	11.77%	56	8.59%	11.15%
35	6.08%	11.75%	57	8.80%	11.31%
36	6.07%	11.72%	58	9.03%	11.47%
37	6.05%	11.70%	59	9.25%	11.63%
38	6.03%	11.60%	60	9.48%	11.79%
39	6.00%	11.50%	61	9.71%	11.95%
40	5.98%	11.40%	62	9.94%	12.12%
41	5.95%	11.30%	63	12.37%	12.28%
42	5.93%	11.20%	64	14.81%	12.44%
43	5.85%	11.14%	65+	17.25%	12.60%

Table 2b: Turnover Rates for Others

Select Rates during the First 5 Years of Employment

Years of Service	Male	Female
0	24.36%	27.98%
1	21.00%	22.31%
2	16.80%	17.85%
3	13.44%	14.28%
4	9.45%	12.34%

Ultimate Rates after the First 5 Years of Employment

Age	Male	Female	Age	Male	Female
< 23	13.71%	16.50%	44	7.83%	8.22%
23	13.71%	16.51%	45	7.72%	7.90%
24	13.71%	16.51%	46	7.60%	7.58%
25	13.71%	16.52%	47	7.48%	7.26%
26	13.71%	16.53%	48	7.68%	7.23%
27	13.71%	16.54%	49	7.87%	7.20%
28	13.41%	15.94%	50	8.07%	7.17%
29	13.21%	15.34%	51	8.26%	7.14%
30	12.82%	17.75%	52	8.46%	7.11%
31	12.52%	14.15%	53	8.46%	7.26%
32	12.22%	13.55%	54	8.47%	7.42%
33	11.65%	12.90%	55	8.48%	7.57%
34	11.09%	12.24%	56	8.48%	7.72%
35	10.52%	11.58%	57	8.49%	7.88%
36	9.95%	10.92%	58	8.77%	8.15%
37	9.39%	10.26%	59	9.08%	8.42%
38	9.12%	9.98%	60	9.32%	8.69%
39	8.86%	9.70%	61	9.60%	8.96%
40	8.60%	9.42%	62	9.88%	9.24%
41	8.32%	9.14%	63	10.28%	10.51%
42	8.07%	8.86%	64	10.68%	11.78%
43	7.95%	8.54%	65+	11.08%	13.05%

Table 3: Disability Rates

Age	Peace Officer / Firefighter		Others	
	Male	Female	Male	Female
< 23	0.0179%	0.0112%	0.0327%	0.0376%
23	0.0244%	0.0153%	0.0360%	0.0400%
24	0.0310%	0.0194%	0.0392%	0.0424%
25	0.0374%	0.0234%	0.0425%	0.0448%
26	0.0440%	0.0275%	0.0456%	0.0472%
27	0.0505%	0.0316%	0.0489%	0.0496%
28	0.0526%	0.0329%	0.0501%	0.0510%
29	0.0548%	0.0343%	0.0513%	0.0524%
30	0.0570%	0.0356%	0.0524%	0.0538%
31	0.0591%	0.0370%	0.0536%	0.0554%
32	0.0612%	0.0383%	0.0548%	0.0568%
33	0.0634%	0.0397%	0.0566%	0.0586%
34	0.0657%	0.0411%	0.0584%	0.0606%
35	0.0679%	0.0425%	0.0602%	0.0624%
36	0.0702%	0.0439%	0.0620%	0.0644%
37	0.0724%	0.0453%	0.0638%	0.0662%
38	0.0757%	0.0473%	0.0669%	0.0696%
39	0.0789%	0.0493%	0.0701%	0.0728%
40	0.0822%	0.0514%	0.0734%	0.0762%
41	0.0854%	0.0534%	0.0765%	0.0794%
42	0.0886%	0.0554%	0.0797%	0.0826%
43	0.0977%	0.0611%	0.0879%	0.0908%
44	0.1066%	0.0667%	0.0962%	0.0990%
45	0.1157%	0.0723%	0.1043%	0.1072%
46	0.1247%	0.0780%	0.1125%	0.1154%
47	0.1337%	0.0836%	0.1208%	0.1236%
48	0.1462%	0.0914%	0.1329%	0.1360%
49	0.1588%	0.0993%	0.1451%	0.1484%
50	0.1714%	0.1071%	0.1572%	0.1608%
51	0.1839%	0.1150%	0.1694%	0.1734%
52	0.1965%	0.1228%	0.1815%	0.1858%
53	0.2294%	0.1434%	0.2132%	0.2168%
54	0.2624%	0.1640%	0.2450%	0.2478%

Table 4: Retirement Rates

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans. Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

DRAFT



State of Alaska

Teachers' Retirement System Defined Contribution Retirement Plan

For Occupational Death and Disability
and Retiree Medical Benefits

Actuarial Valuation Report
As of June 30, 2020

January 2021

DRAFT



January 7, 2021

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the annual actuarial valuation results of the State of Alaska Teachers' Retirement System Defined Contribution Retirement (TRS DCR) Plan as of June 30, 2020 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2020. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under TRS DCR were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of TRS DCR as of June 30, 2020.

TRS DCR is funded by Employer Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board). The funding objective for TRS DCR is to pay required contributions that remain level as a percent of TRS DCR compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the Unfunded Actuarial Accrued Liability as a level percent of TRS DCR compensation over closed layered 25-year periods. This objective is currently being met and is projected to continue to be met as required by the Alaska State statutes. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status is expected to remain at or above 100%.

The Board and staff of the State of Alaska may use this report for the review of the operations of TRS DCR. Use of this report, for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claims cost rates effective June 30, 2020 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 4.2 and 4.3.

Governmental Accounting Standards Board (GASB) Statement No. 74 (GASB 74) was effective for TRS DCR beginning with fiscal year ending June 30, 2017, and GASB 75 was effective beginning with fiscal year ending June 30, 2018. Separate GASB 74 and GASB 75 reports have been prepared.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the retiree medical portion of TRS DCR. We also believe ASOP 51 does not apply to the occupational death and disability portion of TRS DCR. Therefore, information related to ASOP 51 is not included in this report. However, it may be beneficial to review the ASOP 51 information provided in the TRS valuation report for information on risks that may also relate to the occupational death and disability benefits provided by this plan.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal model are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking

and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan, and to reflect the different Medicare coordination methods between the two plans. The manual rate models are intended to provide benchmark data and pricing capabilities, calculate per capita costs, and calculate actuarial values of different commercial health plans. Buck relied on the models, which were developed using industry data by actuaries and consultants at OptumInsight.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. A more detailed explanation on these adjustments is shown in Sections 4.2 and 4.3 and in the valuation report for the DB plan.

This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

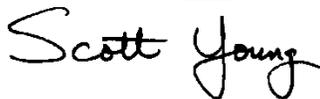
I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,



David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

Contents

- Executive Summary 1**
- Section 1: Actuarial Funding Results 5**
 - Section 1.1: Actuarial Liabilities and Normal Cost5
 - Section 1.2: Actuarial Contributions as of June 30, 2020 for FY236
 - Section 1.3: Actuarial Gain/(Loss) for FY20 10
 - Section 1.4: History of Unfunded Liability and Funded Ratio 11
- Section 2: Plan Assets 12**
 - Section 2.1: Summary of Fair Value of Assets 12
 - Section 2.2: Changes in Fair Value of Assets During FY20 13
 - Section 2.3: Development of Actuarial Value of Assets 14
 - Section 2.4: Historical Asset Rates of Return 16
- Section 3: Member Data 17**
 - Section 3.1: Summary of Members Included 17
 - Section 3.2: Age and Service Distribution of Active Members 18
 - Section 3.3: Member Data Reconciliation 19
 - Section 3.4: Schedule of Active Member Data 20
 - Section 3.5: Active Member Payroll Reconciliation 21
- Section 4: Basis of the Actuarial Valuation 22**
 - Section 4.1: Summary of Plan Provisions 22
 - Section 4.2: Description of Actuarial Methods and Valuation Procedures 26
 - Section 4.3: Summary of Actuarial Assumptions 28
- Glossary of Terms 38**

Executive Summary

Overview

The State of Alaska Teachers' Retirement System Defined Contribution Retirement (TRS DCR) Plan provides occupational death & disability and retiree medical benefits to teachers and other eligible members hired after June 30, 2006 or who have elected participation in this plan. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of TRS DCR as of the valuation date of June 30, 2020.

Purpose

An actuarial valuation is performed on the plan annually as of the end of the fiscal year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining actuarially determined contributions;
4. To compare actual and expected experience under the plan during the last fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of TRS DCR based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Funded Status

Where presented, references to "funded ratio" and "unfunded actuarial accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30 (\$'s in 000's)	2019	2020
Occupational Death & Disability		
a. Actuarial Accrued Liability	\$ 240	\$ 223
b. Valuation Assets	<u>4,359</u>	<u>4,933</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (4,119)	\$ (4,710)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	1,816.3%	2,212.1%
e. Fair Value of Assets	\$ 4,328	\$ 4,823
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	1,803.3%	2,162.8%

Funded Status as of June 30 (\$'s in 000's)	2019	2020
---	------	------

Retiree Medical

a. Actuarial Accrued Liability	\$ 32,981	\$ 40,634
b. Valuation Assets	<u>42,307</u>	<u>49,554</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (9,326)	\$ (8,920)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	128.3%	122.0%
e. Fair Value of Assets	\$ 42,067	\$ 48,413
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	127.5%	119.1%

Total

a. Actuarial Accrued Liability	\$ 33,221	\$ 40,857
b. Valuation Assets	<u>46,666</u>	<u>54,487</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (13,445)	\$ (13,630)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	140.5%	133.4%
e. Fair Value of Assets	\$ 46,395	\$ 53,236
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	139.7%	130.3%

The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions, so there is potential for actuarial gains or losses.

1. Investment Experience

The approximate FY20 investment return based on fair value of assets was 4.3% compared to the expected investment return of 7.38% (net of investment expenses of approximately 0.30%). This resulted in a loss of approximately \$1,507,000 to the plan from investment experience. The asset valuation method recognizes 20 percent of this loss (\$301,000) this year and an additional 20 percent in each of the next 4 years. In addition, 20 percent of the FY16 investment loss, 20 percent of the FY17 investment gain, 20 percent of the FY18 investment loss, and 20 percent of the FY19 investment loss were recognized this year. The approximate FY20 asset return based on actuarial value of assets was 6.3% compared to the expected asset return of 7.38% (net of investment expenses).

2. Salary Increases

Salary increases for continuing active members during FY20 were slightly more than anticipated based on the valuation assumptions, resulting in a very small liability loss (less than \$1,000).

3. Demographic Experience

The number of active members increased 6.7% from 4,998 at June 30, 2019 to 5,332 at June 30, 2020. The average age of active members increased from 41.06 to 41.63 and average credited service increased from 5.67 to 6.03 years.

The demographic experience gains/losses are shown on page 4.

4. Retiree Medical Claims Experience

Please refer to the State of Alaska Teachers' Retirement System (TRS) Defined Benefit Plan Actuarial Valuation Report as of June 30, 2020 for a full description of the assumptions and costs of the retiree medical plan. Adjustments to these costs and assumptions are described in this report.

The recent claims experience described in Section 4.2 of this report (Section 5.2 of the TRS report) created an actuarial gain of approximately \$2,162,000. This gain included an update to the medical and prescription drug relative value factors (described in Section 4.1) this year. In addition, the 0.2% annual trend rate adjustment factor between the DB and DCR plans was removed, which resulted in an actuarial loss of approximately \$2,153,000.

5. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

6. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 4.2. The medical and prescription drug relative value factors were updated this year. In addition, the 0.2% annual trend rate adjustment factor between the DB and DCR plans was removed. The amount included in Normal Cost for administrative expenses for retiree medical was updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

7. Changes in Benefit Provisions Since the Prior Valuation

There have been no changes in benefit provisions valued since the prior valuation.

Comparative Summary of Contribution Rates

Occupational Death & Disability	FY 2022	FY 2023
a. Employer Normal Cost Rate	0.08%	0.08%
b. Past Service Cost Rate	<u>(0.09)%</u>	<u>(0.10)%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.08%	0.08%

Retiree Medical	FY 2022	FY 2023
a. Employer Normal Cost Rate	0.83%	0.87%
b. Past Service Cost Rate	<u>(0.15)%</u>	<u>(0.14)%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.83%	0.87%

Total	FY 2022	FY 2023
a. Employer Normal Cost Rate	0.91%	0.95%
b. Past Service Cost Rate	<u>(0.24)%</u>	<u>(0.24)%</u>
c. Total Employer Contribution Rate, (a) + (b), not less than (a)	0.91%	0.95%

The exhibit below shows the historical Board-adopted employer contribution rates for TRS DCR.

Total Employer Contribution Rate				
Valuation Date	Fiscal Year	Occupational Death & Disability	Retiree Medical	Total
June 30, 2008	FY11	0.28%	0.68%	0.96%
June 30, 2009	FY12	0.00%	0.58%	0.58%
June 30, 2010	FY13	0.00%	0.49%	0.49%
June 30, 2011	FY14	0.00%	0.47%	0.47%
June 30, 2012	FY15	0.00%	2.04%	2.04%
June 30, 2013	FY16	0.00%	2.04%	2.04%
June 30, 2014	FY17	0.00%	1.05%	1.05%
June 30, 2015	FY18	0.00%	0.91%	0.91%
June 30, 2016	FY19	0.08%	0.79%	0.87%
June 30, 2017	FY20	0.08%	1.09%	1.17%
June 30, 2018	FY21	0.08%	0.93%	1.01%
June 30, 2019	FY22	0.08%	0.83%	0.91%
June 30, 2020	FY23	TBD	TBD	TBD

Summary of Actuarial Accrued Liability Gain/(Loss)

The following table shows the FY20 gain/(loss) on actuarial accrued liability as of June 30, 2020 (\$'s in 000's):

	Occupational Death & Disability	Retiree Medical	Total
Retirement Experience	\$ 0	\$ 240	\$ 240
Termination Experience	(4)	744	740
Disability Experience	199	(21)	178
Active Mortality Experience	111	(43)	68
Inactive Mortality Experience	(1)	(7)	(8)
Salary Increases	0	N/A	0
New Entrants	0	(495)	(495)
Rehires	1	(2,314)	(2,313)
Per Capita Claims Costs	N/A	2,162	2,162
Elimination of 0.2% Annual Trend Rate Adjustment	N/A	(2,153)	(2,153)
Miscellaneous ¹	9	(151)	(142)
Total	\$ 315	\$ (2,038)	\$ (1,723)

¹ Includes the effects of various data changes that are typical when new census data is received for the annual valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories.

Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost (\$'s in 000's)

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Occupational Death Benefits	\$ 789	\$ 85
Occupational Disability Benefits	1,312	(58)
Medical and Prescription Drug Benefits	77,331	49,213
Medicare Part D Subsidy	<u>(14,935)</u>	<u>(9,504)</u>
Subtotal	\$ 64,497	\$ 39,736
Benefit Recipients		
Survivor Benefits	\$ 0	\$ 0
Disability Benefits	196	196
Medical and Prescription Drug Benefits	1,145	1,145
Medicare Part D Subsidy	<u>(220)</u>	<u>(220)</u>
Subtotal	\$ 1,121	\$ 1,121
Total	\$ 65,618	\$ 40,857
Total Occupational Death & Disability	\$ 2,297	\$ 223
Total Retiree Medical, Net of Part D Subsidy	\$ 63,321	\$ 40,634
Total Retiree Medical, Gross of Part D Subsidy	\$ 78,476	\$ 50,358
As of June 30, 2020	Normal Cost	
Active Members		
Occupational Death Benefits	\$	111
Occupational Disability Benefits		201
Medical and Prescription Drug Benefits		4,199
Medicare Part D Subsidy		<u>(811)</u>
Subtotal	\$	3,700
Administrative Expense Load		
Occupational Death & Disability	\$	0
Retiree Medical		<u>8</u>
Subtotal	\$	8
Total	\$	3,708
Total Occupational Death & Disability	\$	312
Total Retiree Medical, Net of Part D Subsidy	\$	3,396
Total Retiree Medical, Gross of Part D Subsidy	\$	4,207

Section 1.2: Actuarial Contributions as of June 30, 2020 for FY23 (\$'s in 000's)

Normal Cost Rate	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 312	\$ 3,396	\$ 3,708
2. DCR Plan Rate Payroll Projected for FY21	391,854	391,854	391,854
3. Employer Normal Cost Rate, (1) ÷ (2)	0.08%	0.87%	0.95%
Past Service Cost Rate			
1. Actuarial Accrued Liability	\$ 223	\$ 40,634	\$ 40,857
2. Valuation Assets	4,933	49,554	54,487
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ (4,710)	\$ (8,920)	\$ (13,630)
4. Funded Ratio based on Valuation Assets	2,212.1%	122.0%	133.4%
5. Past Service Cost Amortization Payment	(376)	(533)	(909)
6. DCR Plan Rate Payroll Projected for FY21	391,854	391,854	391,854
7. Past Service Cost Rate, (5) ÷ (6)	(0.10%)	(0.14%)	(0.24%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.08%	0.87%	0.95%

The table below shows the total employer contribution rate based on total DB and DCR Plan payroll for informational purposes.

Total Employer Contribution Rate as Percent of Total Payroll	Occupational Death & Disability	Retiree Medical	Total
1. Total Normal Cost	\$ 312	\$ 3,396	\$ 3,708
2. Total DB and DCR Plan Rate Payroll Projected for FY21	741,091	741,091	741,091
3. Employer Normal Cost Rate, (1) ÷ (2)	0.04%	0.46%	0.50%
4. Past Service Cost Amortization Payment	(376)	(533)	(909)
5. Past Service Cost Rate, (4) ÷ (2)	(0.05%)	(0.07%)	(0.12%)
Total Employer Contribution Rate, not less than Normal Cost Rate	0.04%	0.46%	0.50%

Schedule of Past Service Cost Amortizations - Occupational Death & Disability (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ 16	\$ 15	\$ 2
FY08 Gain	06/30/2008	13	(392)	(380)	(38)
Change in Assumptions	06/30/2009	14	(82)	(81)	(8)
FY09 Gain	06/30/2009	14	(594)	(592)	(55)
Change in Assumptions	06/30/2010	15	(7)	(8)	(1)
FY10 Gain	06/30/2010	15	(479)	(483)	(43)
FY11 Gain	06/30/2011	16	(560)	(570)	(49)
FY12 Gain	06/30/2012	17	(129)	(133)	(11)
FY13 Gain	06/30/2013	18	(149)	(152)	(12)
Change in Assumptions	06/30/2014	19	(50)	(53)	(4)
PRPA Modification	06/30/2014	19	(25)	(25)	(2)
FY14 Gain	06/30/2014	19	(255)	(262)	(20)
FY15 Gain	06/30/2015	20	(275)	(282)	(21)
FY16 Gain	06/30/2016	21	(209)	(215)	(15)
FY17 Gain	06/30/2017	22	(251)	(254)	(18)
Change in Assumptions ¹	06/30/2018	23	0	0	0
FY18 Gain	06/30/2018	23	(257)	(259)	(18)
FY19 Gain	06/30/2019	24	(338)	(339)	(22)
FY20 Gain	06/30/2020	25	(637)	(637)	(41)
Total				\$ (4,710)	\$ (376)

¹ The net effect of changing assumptions was less than \$1,000.

Schedule of Past Service Cost Amortizations - Retiree Medical (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (239)	\$ (230)	\$ (24)
Change in Assumptions	06/30/2008	13	84	86	9
FY08 Gain	06/30/2008	13	(393)	(380)	(38)
Change in Assumptions	06/30/2009	14	(69)	(67)	(6)
FY09 Gain	06/30/2009	14	(281)	(281)	(26)
Change in Assumptions ¹	06/30/2010	15	0	0	0
FY10 Gain	06/30/2010	15	(545)	(549)	(49)
FY11 Gain	06/30/2011	16	(94)	(94)	(8)
Change in Assumptions	06/30/2012	17	11,518	11,819	966
FY12 Gain	06/30/2012	17	(60)	(58)	(5)
FY13 Loss	06/30/2013	18	3,439	3,544	279
Change in Assumptions	06/30/2014	19	(9,736)	(10,029)	(762)
FY14 Loss	06/30/2014	19	1,616	1,663	126
FY15 Gain	06/30/2015	20	(3,485)	(3,581)	(264)
EGWP Impact	06/30/2016	21	(6,400)	(6,547)	(468)
FY16 Loss	06/30/2016	21	958	983	70
Change in Assumptions	06/30/2017	22	7,645	7,768	540
FY17 Gain	06/30/2017	22	(1,451)	(1,474)	(102)
Change in Assumptions/Methods	06/30/2018	23	(9,505)	(9,574)	(648)
FY18 Loss	06/30/2018	23	2,491	2,509	170
FY19 Gain	06/30/2019	24	(4,904)	(4,926)	(325)
Change in Assumptions/Methods	06/30/2020	25	2,153	2,153	139
FY20 Gain	06/30/2020	25	(1,655)	(1,655)	(107)
Total				\$ (8,920)	\$ (533)

¹ The net effect of changing assumptions was less than \$1,000. The demographic assumption changes decreased liability by \$133,000 and the economic assumptions changes increased the liability by \$133,000. Therefore, the net effect of all assumptions changes is \$0 for amortization purposes.

Schedule of Past Service Cost Amortizations - Total (\$'s in 000's)

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	06/30/2007	12	\$ (223)	\$ (215)	\$ (22)
Change in Assumptions	06/30/2008	13	84	86	9
FY08 Gain	06/30/2008	13	(785)	(760)	(76)
Change in Assumptions	06/30/2009	14	(151)	(148)	(14)
FY09 Gain	06/30/2009	14	(875)	(873)	(81)
Change in Assumptions	06/30/2010	15	(7)	(8)	(1)
FY10 Gain	06/30/2010	15	(1,024)	(1,032)	(92)
FY11 Gain	06/30/2011	16	(654)	(664)	(57)
Change in Assumptions	06/30/2012	17	11,518	11,819	966
FY12 Gain	06/30/2012	17	(189)	(191)	(16)
FY13 Loss	06/30/2013	18	3,290	3,392	267
Change in Assumptions	06/30/2014	19	(9,786)	(10,082)	(766)
PRPA Modification	06/30/2014	19	(25)	(25)	(2)
FY14 Loss	06/30/2014	19	1,361	1,401	106
FY15 Gain	06/30/2015	20	(3,760)	(3,863)	(285)
EGWP Impact	06/30/2016	21	(6,400)	(6,547)	(468)
FY16 Loss	06/30/2016	21	749	768	55
Change in Assumptions	06/30/2017	22	7,645	7,768	540
FY17 Gain	06/30/2017	22	(1,702)	(1,728)	(120)
Change in Assumptions/Methods	06/30/2018	23	(9,505)	(9,574)	(648)
FY18 Loss	06/30/2018	23	2,234	2,250	152
FY19 Gain	06/30/2019	24	(5,242)	(5,265)	(347)
Change in Assumptions/Methods	06/30/2020	25	2,153	2,153	139
FY20 Gain	06/30/2020	25	(2,292)	(2,292)	(148)
Total				\$ (13,630)	\$ (909)

Section 1.3: Actuarial Gain/(Loss) for FY20 (\$'s in 000's)

	Occupational Death & Disability	Retiree Medical	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2019	\$ 240	\$ 32,981	\$ 33,221
b. Normal Cost	284	2,967	3,251
c. Interest on (a) and (b) at 7.38%	39	2,653	2,692
d. Employer Group Waiver Plan	0	1	1
e. Benefit Payments	(24)	(6)	(30)
f. Interest on (d) and (e) at 7.38%, adjusted for timing	(1)	0	(1)
g. Assumption/Method Changes	0	2,153	2,153
h. Expected Actuarial Accrued Liability as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g)	<u>\$ 538</u>	<u>\$ 40,749</u>	<u>\$ 41,287</u>
2. Actual Actuarial Accrued Liability as of June 30, 2020	<u>223</u>	<u>40,634</u>	<u>40,857</u>
3. Liability Gain/(Loss), (1)(h) - (2)	\$ 315	\$ 115	\$ 430
4. Expected Actuarial Asset Value			
a. Actuarial Asset Value as of June 30, 2019	\$ 4,359	\$ 42,307	\$ 46,666
b. Interest on (a) at 7.38%	322	3,122	3,444
c. Employer Contributions	329	4,461	4,790
d. Employer Group Waiver Plan	0	1	1
e. Interest on (c) and (d) at 7.38%, adjusted for timing	12	162	174
f. Benefit Payments	(24)	(6)	(30)
g. Administrative Expenses	0	(9)	(9)
h. Interest on (f) and (g) at 7.38%, adjusted for timing	(1)	(1)	(2)
i. Expected Actuarial Asset Value as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	<u>\$ 4,997</u>	<u>\$ 50,037</u>	<u>\$ 55,034</u>
5. Actuarial Asset Value as of June 30, 2020	<u>4,933</u>	<u>49,554</u>	<u>54,487</u>
6. Actuarial Asset Gain/(Loss), (5) - (4)(i)	\$ (64)	\$ (483)	\$ (547)
7. Total Actuarial Gain/(Loss), (3) + (6)	\$ 251	\$ (368)	\$ (117)
8. Contribution Gain/(Loss)	\$ 386	\$ 2,027	\$ 2,413
9. Administrative Expense Gain/(Loss)	\$ 0	\$ (4)	\$ (4)
10. FY20 Gain/(Loss), (7) + (8) + (9)	\$ 637	\$ 1,655	\$ 2,292

Section 1.4: History of Unfunded Liability and Funded Ratio (\$'s in 000's)

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2007	\$ 374	\$ 597	159.7%	\$ (223)
June 30, 2008	801	1,728	215.7%	(927)
June 30, 2009	1,460	3,424	234.5%	(1,964)
June 30, 2010	2,448	5,472	223.5%	(3,024)
June 30, 2011	3,858	7,566	196.1%	(3,708)
June 30, 2012	16,874	9,285	55.0%	7,589
June 30, 2013	22,138	11,146	50.3%	10,992
June 30, 2014	16,296	13,611	83.5%	2,685
June 30, 2015	19,797	20,847	105.3%	(1,050)
June 30, 2016	22,007	28,733	130.6%	(6,726)
June 30, 2017	33,707	34,586	102.6%	(879)
June 30, 2018	32,459	40,621	125.1%	(8,162)
June 30, 2019	33,221	46,666	140.5%	(13,445)
June 30, 2020	40,857	54,487	133.4%	(13,630)

Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets (\$'s in 000's)

As of June 30, 2020	Occupational Death & Disability	Retiree Medical	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	\$ 50	\$ 506	\$ 556	1.1%
- Subtotal	\$ 50	\$ 506	\$ 556	1.1%
Fixed Income Investments				
- Domestic Fixed Income Pool	\$ 1,037	\$ 10,385	\$ 11,422	21.6%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	\$ 1,037	\$ 10,385	\$ 11,422	21.6%
Equity Investments				
- Domestic Equity Pool	\$ 1,307	\$ 13,085	\$ 14,392	27.3%
- International Equity Pool	746	7,466	8,212	15.5%
- Private Equity Pool	591	5,921	6,512	12.3%
- Emerging Markets Equity Pool	156	1,561	1,717	3.3%
- Alternative Equity Strategies	260	2,605	2,865	5.4%
- Subtotal	\$ 3,060	\$ 30,638	\$ 33,698	63.8%
Other Investments				
- Real Estate Pool	\$ 295	\$ 2,954	\$ 3,249	6.2%
- Other Investments Pool	353	3,528	3,881	7.3%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	0	0	0.0%
- Subtotal	\$ 648	\$ 6,482	\$ 7,130	13.5%
Total Cash and Investments	\$ 4,795	\$ 48,011	\$ 52,806	100.0%
Net Accrued Receivables	28	402	430	
Net Assets	\$ 4,823	\$ 48,413	\$ 53,236	

Section 2.2: Changes in Fair Value of Assets During FY20 (\$'s in 000's)

Fiscal Year 2020	Occupational Death & Disability	Retiree Medical	Total
1. Fair Value of Assets as of June 30, 2019	\$ 4,328	\$ 42,067	\$ 46,395
2. Additions:			
a. Member Contributions	\$ 0	\$ 0	\$ 0
b. Employer Contributions	329	4,461	4,790
c. Interest and Dividend Income	68	674	742
d. Net Appreciation/(Depreciation) in Fair Value of Investments	135	1,350	1,485
e. Employer Group Waiver Plan	0	1	1
f. Other	0	0	0
g. Total Additions	\$ 532	\$ 6,486	\$ 7,018
3. Deductions:			
a. Medical Benefits	\$ 0	\$ 6	\$ 6
b. Death & Disability Benefits	24	0	24
c. Investment Expenses	13	125	138
d. Administrative Expenses	0	9	9
e. Total Deductions	\$ 37	\$ 140	\$ 177
4. Fair Value of Assets as of June 30, 2020	\$ 4,823	\$ 48,413	\$ 53,236
5. Approximate Fair Value Investment Return Rate during FY20 Net of Investment Expenses	4.2%	4.3%	4.3%

Section 2.3: Development of Actuarial Value of Assets (\$'s in 000's)

The actuarial value of assets and the fair value were \$0 at June 30, 2006. Investment gains and losses are recognized 20% per year over 5 years. In no event may valuation assets be less than 80% or more than 120% of fair value as of the current valuation date.

	Occupational Death & Disability	Retiree Medical	Total
1. Investment Gain/(Loss) for FY20			
a. Fair Value as of June 30, 2019	\$ 4,328	\$ 42,067	\$ 46,395
b. Contributions	329	4,461	4,790
c. Employer Group Waiver Plan	0	1	1
d. Benefit Payments	24	6	30
e. Administrative Expenses	0	9	9
f. Actual Investment Return (net of investment expenses)	190	1,899	2,089
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return	330	3,266	3,596
i. Investment Gain/(Loss) for the Year (f) - (h)	(140)	(1,367)	(1,507)
2. Actuarial Value as of June 30, 2020			
a. Fair Value as of June 30, 2020	\$ 4,823	\$ 48,413	\$ 53,236
b. Deferred Investment Gain/(Loss)	(110)	(1,141)	(1,251)
c. Preliminary Actuarial Value as of June 30, 2020, (a) - (b)	4,933	49,554	54,487
d. Upper Limit: 120% of Fair Value as of June 30, 2020	5,787	58,095	63,882
e. Lower Limit: 80% of Fair Value as of June 30, 2020	3,859	38,731	42,590
f. Actuarial Value at June 30, 2020, (c) limited by (d) and (e)	4,933	49,554	54,487
3. Ratio of Actuarial Value of Assets to Fair Value of Assets			
	102.3%	102.4%	102.3%
4. Approximate Actuarial Value Investment Return Rate during FY20 Net of Investment Expenses			
	6.0%	6.3%	6.3%

The tables below show the development of the gains/(losses) to be recognized in the current year (\$'s in 000's):

Occupational Death & Disability				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (269)	\$ (216)	\$ (53)	\$ 0
June 30, 2017	143	87	28	28
June 30, 2018	8	4	2	2
June 30, 2019	(48)	(10)	(10)	(28)
June 30, 2020	<u>(140)</u>	<u>0</u>	<u>(28)</u>	<u>(112)</u>
Total	\$ (306)	\$ (135)	\$ (61)	\$ (110)

Retiree Medical				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (1,674)	\$ (1,340)	\$ (334)	\$ 0
June 30, 2017	1,184	711	237	236
June 30, 2018	(19)	(8)	(4)	(7)
June 30, 2019	(460)	(92)	(92)	(276)
June 30, 2020	<u>(1,367)</u>	<u>0</u>	<u>(273)</u>	<u>(1,094)</u>
Total	\$ (2,336)	\$ (729)	\$ (466)	\$ (1,141)

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (1,943)	\$ (1,556)	\$ (387)	\$ 0
June 30, 2017	1,327	798	265	264
June 30, 2018	(11)	(4)	(2)	(5)
June 30, 2019	(508)	(102)	(102)	(304)
June 30, 2020	<u>(1,507)</u>	<u>0</u>	<u>(301)</u>	<u>(1,206)</u>
Total	\$ (2,642)	\$ (864)	\$ (527)	\$ (1,251)

Section 2.4: Historical Asset Rates of Return

Year Ending	Actuarial Value		Fair Value	
	Annual	Cumulative*	Annual	Cumulative*
June 30, 2008	6.4%	6.4%	(0.3%)	(0.3%)
June 30, 2009	3.2%	4.8%	(12.0%)	(6.3%)
June 30, 2010	4.2%	4.6%	6.4%	(2.3%)
June 30, 2011	7.4%	5.3%	18.9%	2.6%
June 30, 2012	6.9%	5.6%	1.6%	2.4%
June 30, 2013	7.7%	6.0%	11.9%	3.9%
June 30, 2014	10.9%	6.6%	18.0%	5.8%
June 30, 2015	9.5%	7.0%	3.1%	5.5%
June 30, 2016	6.5%	6.9%	(0.1%)	4.9%
June 30, 2017	7.6%	7.0%	12.6%	5.6%
June 30, 2018	7.8%	7.1%	8.0%	5.8%
June 30, 2019	6.4%	7.0%	6.2%	5.9%
June 30, 2020	6.3%	7.0%	4.3%	5.7%

* Cumulative since fiscal year ending June 30, 2008

Section 3: Member Data

Section 3.1: Summary of Members Included

As of June 30	2016	2017	2018	2019	2020
Active Members					
1. Number	4,383	4,694	4,915	4,998	5,332 ¹
2. Average Age	39.57	40.21	40.64	41.06	41.63
3. Average Credited Service	4.50	4.88	5.30	5.67	6.03
4. Average Entry Age	35.07	35.33	35.34	35.39	35.60
5. Average Annual Earnings	\$ 65,219	\$ 66,542	\$ 68,119	\$ 69,619	\$ 71,118
Disabilitants and Beneficiaries (Occupational Death & Disability)					
1. Number	0	0	0	1	1
2. Average Age	N/A	N/A	N/A	53.45	54.45
3. Average Monthly Death & Disability Benefit	N/A	N/A	N/A	\$ 2,024	\$ 2,024
Retirees, Surviving Spouses, and Dependent Spouses (Retiree Medical)					
1. Number	0	4	9	12	17
2. Average Age	N/A	69.72	68.59	68.54	68.79
Total Number of Members	4,383	4,698	4,924	5,011	5,350

Average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

¹ Includes 1,376 male active members and 3,956 female active members.

Section 3.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	\$ 0	\$ 0
20 - 24	100	5,264,970	52,650
25 - 29	613	36,111,642	58,910
30 - 34	934	61,660,845	66,018
35 - 39	1,068	76,404,382	71,540
40 - 44	815	59,917,766	73,519
45 - 49	575	43,754,516	76,095
50 - 54	477	36,408,923	76,329
55 - 59	403	31,603,348	78,420
60 - 64	239	19,252,737	80,555
65 - 69	84	6,907,610	82,233
70 - 74	20	1,531,296	76,565
75+	4	382,756	95,689

Total 5,332 \$ 379,200,791 \$ 71,118

Annual Earnings by Credited Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	134	\$ 7,253,235	\$ 54,129
1	646	39,337,478	60,894
2	574	37,066,265	64,575
3	494	32,421,369	65,630
4	478	32,777,831	68,573
0 - 4	2,326	\$ 148,856,178	\$ 63,997
5 - 9	1,841	134,954,143	73,305
10 - 14	1,162	95,121,574	81,860
15 - 19	2	174,019	87,010
20 - 24	1	94,877	94,877
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40+	0	0	0

Total 5,332 \$ 379,200,791 \$ 71,118

Years of Credited Service by Age

Age	Years of Service										Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+		
0 - 19	0	0	0	0	0	0	0	0	0	0	0
20 - 24	100	0	0	0	0	0	0	0	0	0	100
25 - 29	505	108	0	0	0	0	0	0	0	0	613
30 - 34	441	440	53	0	0	0	0	0	0	0	934
35 - 39	325	380	363	0	0	0	0	0	0	0	1,068
40 - 44	297	289	228	1	0	0	0	0	0	0	815
45 - 49	213	199	163	0	0	0	0	0	0	0	575
50 - 54	169	172	135	0	1	0	0	0	0	0	477
55 - 59	146	136	121	0	0	0	0	0	0	0	403
60 - 64	83	84	71	1	0	0	0	0	0	0	239
65 - 69	32	27	25	0	0	0	0	0	0	0	84
70 - 74	14	4	2	0	0	0	0	0	0	0	20
75+	1	2	1	0	0	0	0	0	0	0	4

Total 2,326 1,841 1,162 2 1 0 0 0 0 0 5,332

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 3.3: Member Data Reconciliation

	Actives	Retirees and Surviving Spouses	Dependent Spouses	OD&D Disabilitants	OD&D Beneficiaries	Total
As of June 30, 2019 ¹	4,998	10	2	1	0	5,011
New Entrants	664	0	0	0	0	664
Rehires	306	0	0	0	0	306
Vested Terminations	(230)	0	0	0	0	(230)
Non-Vested Terminations	(358)	0	0	0	0	(358)
Refund of Contributions	(42)	0	0	0	0	(42)
Disability Retirements	0	0	0	0	0	0
Age Retirements	(4)	4	1	0	0	1
Deaths With Beneficiary	0	0	0	0	0	0
Deaths Without Beneficiary	(2)	0	0	0	0	(2)
Data Corrections	0	0	0	0	0	0
Net Change	334	4	1	0	0	339
As of June 30, 2020 ²	5,332	14	3	1	0	5,350

¹ 117 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

² 125 participants are expected to receive retiree medical benefits in a different plan and are included for OD&D benefits only.

Section 3.4: Schedule of Active Member Data

Valuation Date	Number	Annual Earnings (000's)	Annual Average Earnings	Percent Increase in Average Earnings	Number of Participating Employers
June 30, 2020	5,332	\$ 379,201	\$ 71,118	2.2%	57
June 30, 2019	4,998	347,957	69,619	2.2%	57
June 30, 2018	4,915	334,803	68,119	2.4%	57
June 30, 2017	4,694	312,347	66,542	2.0%	57
June 30, 2016	4,383	285,854	65,219	2.5%	58
June 30, 2015	4,095	260,584	63,635	2.7%	58
June 30, 2014	3,547	219,701	61,940	2.4%	58
June 30, 2013	3,272	197,944	60,496	3.5%	58
June 30, 2012	3,057	178,761	58,476	4.7%	58
June 30, 2011	2,708	151,269	55,860	5.6%	58

Total and average annual earnings ("valuation pay") are the annualized earnings for the fiscal year ending on the valuation date.

Section 3.5: Active Member Payroll Reconciliation

Payroll Field	Payroll Data (000's)
a) DRB actual reported salaries FY20 in employer list	\$ 411,891
b) DRB actual reported salaries FY20 in valuation data	371,022
c) Annualized valuation data	379,201
d) Valuation payroll as of June 30, 2020	396,606
e) Rate payroll for FY21	391,854

- a) Actual reported salaries from DRB employer listing showing all payroll paid during FY20, including those who were not active as of June 30, 2020
- b) Payroll from valuation data for people who are in active status as of June 30, 2020
- c) Payroll from (b) annualized for both new entrants and part-timers
- d) Payroll from (c) with one year of salary scale applied to estimate salaries payable for the upcoming year
- e) Payroll from (d) with the part-timer annualization removed

Section 4: Basis of the Actuarial Valuation

Section 4.1: Summary of Plan Provisions

Effective Date

July 1, 2006, with amendments through June 30, 2020.

Administration of Plan

The Commissioner of Administration or the Commissioner's designee is the administrator of the Plan. The Attorney General of the state is the legal counsel for the Plan and shall advise the administrator and represent the Plan in legal proceedings.

The Alaska Retirement Management Board prescribes policies, adopts regulations, invests the funds, and performs other activities necessary to carry out the provisions of the Plan.

Employers Included

Currently there are 57 employers participating in TRS DCR, including the State of Alaska, 53 school districts, and three other eligible organizations.

Membership

An employee of a participating employer who first enters service on or after July 1, 2006, or a member of the defined benefit plan who works for an employer who began participation on or after July 1, 2006, and meets the following criteria is a member in the Plan:

- Permanent full-time or part-time elementary or secondary teachers, school nurses, or a person in a position requiring a teaching certificate as a condition of hire in a public school of the State of Alaska, the Department of Education and Early Development, or in the Department of Labor and Workforce Development.
- Full-time or part-time teachers at the University of Alaska or persons occupying full-time administrative positions requiring academic standing who are not in the University's Optional Retirement Plan.

Members can convert to TRS DCR if they are an eligible non-vested member of the TRS defined benefit plan whose employer consents to transfers to the defined contribution plan and they elect to transfer his or her account balance to TRS DCR.

Member Contributions

Other than the member-paid premiums discussed later in this section, there are no member contributions for the occupational death & disability and retiree medical benefits.

Retiree Medical Benefits

- Member must retire directly from the plan to be eligible for retiree medical coverage. Normal retirement eligibility is the earlier of a) 30 years of service or b) Medicare eligible and 10 years of service.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's and any covered dependent's premium is 100% until the member is Medicare eligible. Upon the member's Medicare-eligibility, the required contribution will follow the service-based schedule shown below.
- Coverage cannot be denied except for failure to pay premium.
- Members who are receiving disability benefits or survivors who are receiving monthly survivor benefits are not eligible until the member meets, or would have met if he/she had lived, the normal retirement eligibility requirements.
- The following is a summary of the medical benefit design adopted in July 2016. The plan description below is used for valuation purposes and indicates participant cost-sharing. Please refer to the benefit handbook for more details.

Plan Design Feature	In-Network ¹	Out-of-Network ^{1 2}
Deductible (single / family)	\$300 / \$600	
Medical services (participant share)	20%	40%
Emergency Room Copay (non-emergent use)	\$100	\$100
Medical Out-of-Pocket Maximum (single / family, including deductible)	\$1,500 / \$3,000	\$3,000 / \$6,000
Medicare Coordination	Exclusion	Exclusion
Pharmacy	No Deductible	No Deductible
Retail Generic (per 30-day fill)	20% \$10 min / \$50 max	
Retail Non-Formulary Brand (per 30-day fill)	25% \$25 min / \$75 max	40%
Retail Formulary Brand (per 30-day fill)	35% \$80 min / \$150 max	
Mail-Order Generic	\$20 copay	
Mail-Order Non-Formulary Brand	\$50 copay	40%
Mail-Order Formulary Brand	\$100 copay	
Pharmacy Out-of-Pocket Max (single / family)	\$1,000 / \$2,000	
Medicare Pharmacy Arrangement	Retiree Drug Subsidy / Employer Group Waiver Plan effective 1/1/2019	
Wellness / Preventative	100% covered, not subject to deductible	20%, after deductible

¹ Section 1.1 of the AlaskaCare Defined Contribution Retiree Benefit Plan states that this health plan shall be updated from time to time to reflect changes in benefits, including annual adjustments to the premium, deductible, coinsurance, medical out-of-pocket limit, and prescription drug out-of-pocket limit.

² OON applies only to non-Medicare eligible participants.

- Buck used manual rate models to determine relative plan values for the defined benefit (DB) retiree medical plan and the DCR retiree medical plan outlined above. We applied the ratio of the DCR retiree medical plan value to the DB retiree medical plan value to the per capita costs determined for each of pre/post-Medicare medical and pharmacy benefits to estimate corresponding values for the DCR retiree medical plan design. These factors are noted in Section 4.3. We further adjusted the Medicare medical manual rate to reflect the Medicare coordination method adopted. The estimated 2021 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates). We reflect estimated discounts and pharmacy rebates in the defined benefit medical cost so no further adjustment was needed for the DCR retiree medical plan. The medical network differential is reflected in the relative plan value adjustments.
- The retiree medical plan’s coverage is supplemental to Medicare. Medicare coordination is described in the 2020 DCR Plan Handbook, referred to in the industry as exclusion coordination: Medicare payment is deducted from the Medicare allowable expense and plan parameters are applied to the remaining amount. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.
- The premium for Medicare-eligible retirees will be based on the member’s years of service. The percentage of premium paid by the member is as follows:

Years of Service	Percent of Premium Paid by Member
< 15	30%
15 – 19	25%
20 – 24	20%
25 – 29	15%
30+	10%

- The premium for dependents who are not eligible for Medicare aligns with the member’s subsidy. While a member is not Medicare-eligible, premiums are 100% of the estimated cost.
- Members have a separate defined contribution Health Reimbursement Arrangement account, which is not reflected in this valuation, that can be used to pay for premiums or other medical expenses.
- For valuation purposes, retiree premiums were assumed to equal the percentages outlined in the table above times the age-related plan costs. Future premiums calculated and charged to DCR participants will need to be determined reflecting any appropriate adjustments to the defined benefit (DB) plan data because current DB premiums were determined using information based upon enrollment with members who have double coverage.
- Coverage will continue for surviving spouses of covered retired members.

Occupational Disability Benefits

- Benefit is 40% of salary at date of disability.
- Disability Benefit Adjustment: The disability benefit is increased by 75% of the cost of living increase in the preceding calendar year or 9%, whichever is less.
- Member earns service while on occupational disability.
- Benefits cease when the member becomes eligible for normal retirement at Medicare-eligible age and 10 years of service, or at any age with 30 years of service.
- No subsidized retiree medical benefits are provided until normal retirement eligibility. The member's premium is 100% of the estimated cost until they are Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Occupational Death Benefits

- Benefit is 40% of salary.
- Survivor's Pension Adjustment: A survivor's pension is increased by 50% of the cost of living increase in the preceding calendar year or 6%, whichever is less, if the recipient is at least age 60 on July 1, or under age 60 if the recipient has been receiving TRS benefits for at least 8 years as of July 1.
- Benefits cease when the member would have become eligible for normal retirement.
- The period during which the survivor is receiving benefits is counted as service credit toward retiree medical benefits.
- No subsidized retiree medical benefits are provided until the member would have been eligible for normal retirement. The surviving spouse's premium is 100% of the estimated cost until the member would have been Medicare eligible. Medicare-eligible premiums follow the service-based schedule above.

Changes Since the Prior Valuation

There have been no changes in TRS DCR benefit provisions valued since the prior valuation.

Section 4.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006, and was modified as part of the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was implemented effective June 30, 2006.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay. Each year's difference between actual and expected unfunded actuarial accrued liability is amortized over 25 years as a level percentage of expected payroll.

Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year for death and disability benefits and retiree medical benefits, from the assumed entry age to the last age with a future benefit were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total DCR Plan payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for beneficiaries and disabled members currently receiving benefits (if any) was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

Valuation of Assets

Effective June 30, 2006, the asset valuation method recognizes 20% of the investment gain or loss in each of the current and preceding four years. This method was phased in over five years. Fair Value of Assets was \$0 as of June 30, 2006. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP. Valuation assets are constrained to a range of 80% to 120% of the fair value of assets.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

The methodology used for the valuation of the retiree medical benefits is described in Section 5.2 of the State of Alaska Teachers' Retirement System Defined Benefit Plan Actuarial Valuation Report as of June 30, 2020.

Due to the lack of experience for the DCR retiree medical plan only, base claims costs are based on those described in the actuarial valuation as of June 30, 2020 for the Defined Benefit (DB) retiree medical plan covering TRS and PERS. The DB rates were used with some adjustments. The claims costs were adjusted to reflect the differences between the DCR medical plan and the DB medical plan. These differences include network steerage, different coverage levels, different Medicare coordination for medical benefits, and an indexing of the retiree out-of-pocket dollar amounts. To account for higher initial copays, deductibles and out-of-pocket limits, projected FY21 claims costs were reduced 3.1% for medical claims, and 8.9% for prescription drugs. In addition, to account for the difference in Medicare coordination, projected FY21 medical claims costs for Medicare eligible retirees were further reduced 29.5%.

FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19.

No implicit subsidies are assumed. Employees projected to retire with 30 years of service prior to Medicare are valued with commencement deferred to Medicare eligibility, because those members will be required to pay the full plan premium prior to Medicare. Explicit subsidies for disabled and normal retirement are determined using the plan-defined percentages of age-related total projected plan costs, again with no implicit subsidy assumed.

The State transitioned to an Employer Group Waiver Program (EGWP) for DCR participants effective January 1, 2019. The estimated 2021 reimbursements under EGWP were provided by Segal Consulting (who worked with the EGWP administrator, Optum, to develop those estimates).

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, not all provisions are required. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. The adopted DCR plan does not place lifetime limits on benefits, but does restrict dependent child coverage.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA's individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

DRAFT

Section 4.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2020 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

Salary scale rates based upon the 2013-2017 actual experience (see Table 1).

Inflation – 2.50% per year.

Productivity – 0.25% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 white-collar employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Deaths are assumed to result from occupational causes 15% of the time.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

93% of male and 90% of female rates of RP-2014 white-collar healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select and ultimate rates based upon the 2013-2017 actual experience (see Table 2).

Disability

Incidence rates based upon the 2013-2017 actual experience (see Table 3).

Disabilities are assumed to be occupational 15% of the time.

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Retirement

Retirement rates based upon the 2013-2017 actual experience (see Table 4).

Spouse Age Difference

Males are assumed to be three years older than their wives. Females are assumed to be two years younger than husbands.

Percent Married for Occupational Death & Disability

85% of male members and 75% of female members are assumed to be married at termination from active service.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. 65% of male members and 60% of female members are assumed to be married and cover a dependent spouse.

Part-Time Status

Part-time employees are assumed to earn 0.75 years of service per year.

Per Capita Claims Cost

Sample claims cost rates (before base claims cost adjustments described below) adjusted to age 65 for FY21 medical and prescription drugs are shown below:

	Medical	Prescription Drugs
Pre-Medicare	\$ 15,360	\$ 3,393
Medicare Parts A & B	\$ 1,618	\$ 3,340
Medicare Part D – EGWP	N/A	\$ 1,003

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2021 fiscal year (July 1, 2020 – June 30, 2021).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

\$449 per person per year; assumed to increase at 4.5% per year.

Base Claims Cost Adjustments

Due to higher initial copays, deductibles, out-of-pocket limits and member cost sharing compared to the DB medical plan, the following cost adjustments are applied to the per capita claims cost rates above:

- 0.969 for the pre-Medicare plan.
- 0.674 for both the Medicare medical plan and Medicare coordination method (3.1% reduction for the medical plan and 29.5% reduction for the coordination method).
- 0.911 for the prescription drug plan.

Administrative Expenses

Beginning with the June 30, 2018 valuation, the Normal Cost is increased for administrative expenses expected to be paid from plan assets during the year. The amounts included in the June 30, 2020 Normal Cost, which are based on the average of actual administrative expenses during the last two fiscal years, are \$0 for occupational death & disability and \$8,000 for retiree medical.

Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.5% is applied to the FY21 pre-Medicare medical claims costs to get the FY22 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY21	6.5%	5.4%	7.5%
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Retiree Medical Participation

Decrement Due to Disability		Decrement Due to Retirement	
Age	Percent Participation	Age	Percent Participation*
< 56	75.0%	55	50.0%
56	77.5%	56	55.0%
57	80.0%	57	60.0%
58	82.5%	58	65.0%
59	85.0%	59	70.0%
60	87.5%	60	75.0%
61	90.0%	61	80.0%
62	92.5%	62	85.0%
63	95.0%	63	90.0%
64	97.5%	64	95.0%
65+	100.0%	65+	Years of Service
			< 15 75.0%
			15 – 19 80.0%
			20 – 24 85.0%
			25 – 29 90.0%
			30+ 95.0%

* Participation assumption is a combination of (i) the service-based rates for retirement from employment at age 65+ and (ii) the age-based rates for retirement from employment before age 65. These rates reflect the expected plan election rate that varies by reason for decrement, duration that a member may pay full cost prior to Medicare eligibility, and availability of alternative and/or lower cost options, particularly in the Medicare market. This assumption is based on observed trends in participation from a range of other plans.

Imputed Data

Data changes from the prior year which are deemed to have immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Changes in Assumptions Since the Prior Valuation

The amount included in the Normal Cost for administrative expenses was changed from \$4,700 to \$8,000 for retiree medical, while occupational death & disability remained at \$0 (based on the most recent two years of actual administrative expenses paid from plan assets). The per capita claims cost assumption is updated annually. The medical and prescription drug relative value factors were updated and the 0.2% annual trend rate adjustment factor between the DB and DCR plans was removed.

DRAFT

Table 1: Salary Scale

Years of Service	Percent Increase
0	6.75%
1	6.25%
2	5.75%
3	5.25%
4	4.75%
5	4.25%
6	3.75%
7	3.65%
8	3.55%
9	3.45%
10	3.35%
11	3.25%
12	3.15%
13	3.05%
14	2.95%
15	2.85%
16+	2.75%

Table 2: Turnover Rates

Select Rates during the First 6 Years of Employment

Years of Service	Male	Female
0	20.70%	21.80%
1	19.55%	18.70%
2	16.10%	15.40%
3	13.80%	13.20%
4	11.50%	11.00%
5	7.32%	8.05%

Ultimate Rates after the First 6 Years of Employment

Age	Male	Female	Age	Male	Female
< 26	9.41%	8.31%	45	9.05%	8.09%
26	9.41%	8.32%	46	8.99%	8.07%
27	9.40%	8.33%	47	8.94%	8.04%
28	9.39%	8.32%	48	8.86%	8.00%
29	9.39%	8.32%	49	8.78%	7.95%
30	9.38%	8.31%	50	8.70%	7.91%
31	9.37%	8.31%	51	8.62%	7.86%
32	9.36%	8.30%	52	8.54%	7.82%
33	9.35%	8.29%	53	8.37%	7.73%
34	9.35%	8.28%	54	8.20%	7.64%
35	9.34%	8.27%	55	8.03%	7.55%
36	9.34%	8.26%	56	7.86%	7.46%
37	9.33%	8.25%	57	7.69%	7.36%
38	9.31%	8.24%	58	7.76%	7.50%
39	9.29%	8.22%	59	7.82%	7.64%
40	9.26%	8.21%	60	7.89%	7.78%
41	9.24%	8.19%	61	7.95%	7.92%
42	9.22%	8.17%	62	8.02%	8.05%
43	9.16%	8.15%	63	8.59%	8.29%
44	9.11%	8.12%	64	9.17%	8.52%
			65+	9.75%	8.75%

Table 3: Disability Rates

Age	Male	Female
< 31	0.0337%	0.0612%
31	0.0337%	0.0613%
32	0.0337%	0.0613%
33	0.0342%	0.0622%
34	0.0347%	0.0631%
35	0.0353%	0.0641%
36	0.0357%	0.0650%
37	0.0362%	0.0659%
38	0.0371%	0.0674%
39	0.0379%	0.0689%
40	0.0387%	0.0703%
41	0.0395%	0.0718%
42	0.0403%	0.0733%
43	0.0423%	0.0770%
44	0.0443%	0.0806%
45	0.0464%	0.0843%
46	0.0483%	0.0879%
47	0.0504%	0.0916%
48	0.0536%	0.0975%
49	0.0569%	0.1034%
50	0.0601%	0.1093%
51	0.0634%	0.1152%
52	0.0666%	0.1211%
53	0.0746%	0.1356%
54	0.0826%	0.1501%

Table 4: Retirement Rates

Age	Rate
< 55	2.0%
55	3.0%
56	3.0%
57	3.0%
58	3.0%
59	3.0%
60	5.0%
61	5.0%
62	10.0%
63	5.0%
64	5.0%
65	25.0%
66	25.0%
67	25.0%
68	20.0%
69	20.0%
70+	100.0%

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans. Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Rate Payroll

Members' earnings used to determine contribution rates.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Valuation Payroll

Members' earnings used to determine Normal Cost and Actuarial Accrued Liability.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

DRAFT



State of Alaska

Judicial Retirement System

Actuarial Valuation Report
As of June 30, 2020

February 2021

DRAFT



February 23, 2021

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the actuarial valuation results of the State of Alaska Judicial Retirement System (JRS) as of June 30, 2020 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, member data provided by the Division of Retirement and Benefits, and medical enrollment data provided by the healthcare claims administrator (Aetna), as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2020. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under JRS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of JRS as of June 30, 2020.

JRS is funded by Employer, State, and Member Contributions in accordance with the funding policy adopted by the Alaska Retirement Management Board (Board) and as required by Alaska state statutes. The funding objective for JRS is to pay required contributions that remain level as a percent of total JRS compensation. The Board has also established a funding policy objective that the required contributions be sufficient to pay the Normal Costs of active plan members, plan expenses, and amortize the annual changes in Unfunded Actuarial Accrued Liability as a level percentage of payroll over closed 25-year periods. The compensation used to determine required contributions is the total compensation of all active members in JRS. This objective is currently being met and is projected to continue to be met. Absent future gains/losses, actuarially determined contributions are expected to remain level as a percent of pay and the overall funded status (on a combined pension/healthcare basis) is expected to increase to 100% after 25 years.

The Board and staff of the State of Alaska may use this report for the review of the operations of JRS. Use of this report, for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. Based on our annual analysis of recent claims experience, changes were made to the per capita claim cost rates effective June 30, 2020 to better reflect expected future healthcare experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 4.2 and 4.3.

Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67) was effective for JRS beginning with fiscal year ending June 30, 2014, and Statement No. 74 (GASB 74) was effective for JRS beginning with fiscal year ending June 30, 2017. Separate GASB 67 and GASB 74 reports as of June 30, 2020 have been prepared. We have also prepared the member data tables shown in Section 3 of this report for the Statistical Section of the CAFR, as well as the summary of actuarial assumptions and analysis of financial experience for the Actuarial Section of the CAFR. Please see our separate GASB 67 and GASB 74 reports for other information needed for the CAFR.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the healthcare portion of JRS. See Section 5 of this report for further details regarding ASOP 51.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as

the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Additional models used in valuing health benefits are described later in the report.

COVID-19

The potential impact of the ongoing COVID-19 pandemic on costs and liabilities was considered and an adjustment was made in setting the medical per capita claims cost assumption. FY20 medical claims were adjusted for a COVID-19 related decline in claims during the last four months (March – June) of FY20. A more detailed explanation on these adjustments is shown in Section 4.2.

This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries, and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available to discuss this report with you at your convenience. I can be reached at 602-803-6174.

Respectfully submitted,



David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

The undersigned actuary is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters in accordance with the Qualification Standards of the American Academy of Actuaries.



Scott Young, FSA, EA, MAAA, FCA
Director
Buck

Contents

Executive Summary	1
Section 1: Actuarial Funding Results	6
Section 1.1: Actuarial Liabilities and Normal Cost	6
Section 1.2: Actuarial Contributions as of June 30, 2020 (for FY23).....	8
Section 1.3: Actuarial Gain/(Loss) for FY20	12
Section 1.4: Development of Change in Unfunded Liability During FY20	13
Section 1.5: History of Unfunded Liability and Funded Ratio	14
Section 2: Plan Assets	15
Section 2.1: Summary of Fair Value of Assets	15
Section 2.2: Changes in Fair Value of Assets During FY19	16
Section 2.3: Changes in Fair Value of Assets During FY20	17
Section 2.4: Development of Actuarial Value of Assets.....	18
Section 2.5: Historical Asset Rates of Return.....	20
Section 3: Member Data.....	21
Section 3.1: Summary of Members Included.....	21
Section 3.2: Age and Service Distribution of Active Members	22
Section 3.3: Member Data Reconciliation.....	23
Section 4: Basis of the Actuarial Valuation	25
Section 4.1: Summary of Plan Provisions.....	25
Section 4.2: Description of Actuarial Methods and Valuation Procedures	28
Section 4.3: Summary of Actuarial Assumptions.....	35
Section 5: Actuarial Standard of Practice No. 51	41
Glossary of Terms	45

Executive Summary

Overview

The State of Alaska Judicial Retirement System (JRS) provides pension and postemployment healthcare benefits to judicial and other eligible participants. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of JRS as of the valuation date of June 30, 2020.

Purpose

An actuarial valuation is performed on the plan once every two years as of the end of the fiscal year, and roll-forward valuations are performed every other year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer/State contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
4. To compare actual and expected experience under the plan during the fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a "snapshot" of the funded position of JRS based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

Funded Status

Where presented, references to “funded ratio” and “unfunded actuarial accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30	2018	2020
Pension		
a. Actuarial Accrued Liability	\$ 226,559,580	\$ 233,346,296
b. Valuation Assets	<u>178,489,284</u>	<u>194,788,043</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 48,070,296	\$ 38,558,253
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	78.8%	83.5%
e. Fair Value of Assets	\$ 176,794,969	\$ 189,844,025
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	78.0%	81.4%
Healthcare		
a. Actuarial Accrued Liability	\$ 16,846,959	\$ 16,562,815
b. Valuation Assets	<u>31,868,079</u>	<u>34,805,639</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ (15,021,120)	\$ (18,242,824)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	189.2%	210.1%
e. Fair Value of Assets	\$ 31,497,603	\$ 34,036,503
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	187.0%	205.5%
Total		
a. Actuarial Accrued Liability	\$ 243,406,539	\$ 249,909,111
b. Valuation Assets	<u>210,357,363</u>	<u>229,593,682</u>
c. Unfunded Actuarial Accrued Liability, (a) - (b)	\$ 33,049,176	\$ 20,315,429
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	86.4%	91.9%
e. Fair Value of Assets	\$ 208,292,572	\$ 223,880,528
f. Funded Ratio based on Fair Value of Assets, (e) ÷ (a)	85.6%	89.6%

The key reasons for the change in the funded status are explained below. The funded status for healthcare benefits is not necessarily an appropriate measure to confirm that assets are sufficient to settle health plan obligations as there are no available financial instruments for purchase. Future experience is likely to vary from assumptions, so there is potential for actuarial gains or losses.

1. Investment Experience

The approximate investment returns based on fair value of assets were 6.0% for FY19 and 4.1% for FY20, compared to the expected investment return of 7.38% (net of investment expenses). This resulted in market asset losses of approximately \$3.1 million for FY19 and \$7.2 million for FY20. Due to the recognition of investment gains and losses over a 5-year period, the investment return based on actuarial value of assets were approximately 5.7% for FY19 and 5.9% for FY20.

2. Salary Increases

Salaries for active judges remained constant between June 30, 2018 and June 30, 2020 (excluding those who are pro tem), which resulted in a small liability loss of approximately \$0.4 million due to several judges moving to higher courts. The following table shows the annual base salaries for each of the court appointments:

	June 30, 2018	June 30, 2020
District Court	\$ 166,668	\$ 166,668
Superior Court	196,584	196,584
Appellate Court	200,856	200,856
Supreme Court	212,604	212,604
Administrative Director	196,584	196,584
Chief Justice	213,228	213,228
Pro Tem	166,680	N/A

3. Demographic Experience

Section 3 provides statistics on active and inactive participants. The number of active participants increased from 71 as of June 30, 2018 to 72 as of June 30, 2020. There were 22 new entrants and 18 retirements during this 2-year period. The average age of active participants decreased from 57.53 to 55.03, their average service decreased from 9.49 to 6.83, and their average entry age increased from 48.04 to 48.20.

The number of benefit recipients increased from 125 to 144, and their average age increased from 73.71 to 73.98. The number of vested terminated participants decreased from 3 to 2, and their average age decreased from 59.05 to 55.87.

The overall effect of the demographic experience was a liability gain of approximately \$0.4 million (pension) and a liability gain of approximately \$0.8¹ million (healthcare).

4. Retiree Medical Claims Experience

As described in Section 4.2, recent medical claims experience and changes in healthcare enrollment data provided to us for the June 30, 2020 valuation generated a liability gain of approximately \$2.3 million.

5. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

6. Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 4.2. The Further Consolidated Appropriations Act, 2020 that was signed in December 2019 made several changes, including the repeal of the Cadillac Tax. The repeal of the Cadillac Tax reduced the plan's liabilities as of June 30, 2020 by approximately \$0.2 million. The amounts included in Normal Cost for administrative expenses were updated based on the last two years of actual administrative expenses paid from plan assets. There were no other changes in actuarial assumptions since the prior valuation.

7. Changes in Benefit Provisions Since the Prior Valuation

There have been no changes in benefit provisions valued since the prior valuation.

¹ Includes the effect of changes in Medicare Part B only experience.

Comparative Summary of Contribution Rates

Pension	FY 2021	FY 2023
a. Normal Cost Rate Net of Member Contributions	42.04%	41.35%
b. Past Service Cost Rate	<u>35.78%</u>	<u>34.11%</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)	77.82%	75.46%
Healthcare	FY 2021	FY 2023
a. Normal Cost Rate	6.12%	5.95%
b. Past Service Cost Rate	<u>(6.45)%</u>	<u>(8.05)%</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)	6.12%	5.95%
Total	FY 2021	FY 2023
a. Normal Cost Rate Net of Member Contributions	48.16%	47.30%
b. Past Service Cost Rate	<u>35.78%</u>	<u>34.11%</u>
c. Total Employer/State Contribution Rate, (a) + (b), not less than (a)	83.94%	81.41%

The contribution rates for FY22 based on a roll-forward valuation as of June 30, 2019 were 70.97% (pension), 6.28% (healthcare), and 77.25% (total). These contribution rates reflect the change in salary increase assumption to 0% for the first two years that was implemented for the June 30, 2019 roll-forward valuation.

Summary of Actuarial Accrued Liability Gain/(Loss) and Other Changes

The following table summarizes the sources of change in the total Employer/State contribution rates as of June 30, 2018, June 30, 2019, and June 30, 2020:

	Pension	Healthcare	Total
1. Total Employer/State Contribution Rate as of June 30, 2018	77.82%	6.12%	83.94%
2. Change during FY19 ¹	<u>(6.85)%</u>	<u>0.16%</u>	<u>(6.69)%</u>
3. Total Employer/State Contribution Rate as of June 30, 2019 from Roll-Forward Valuation	70.97%	6.28%	77.25%
4. Change due to:			
a. Investment Experience	1.33%	0.24%	1.57%
b. Demographic Experience, Health Claims Experience, and New Entrants ²	6.15%	(0.22)%	5.93%
c. State Appropriation	(2.37)%	0.00%	(2.37)%
d. Actual vs Expected Contributions	(0.71)%	(0.38)%	(1.09)%
e. Assumption Changes	<u>0.09%</u>	<u>0.03%</u>	<u>0.12%</u>
f. Total Change, (a) + (b) + (c) + (d) + (e)	4.49%	(0.33)%	4.16%
5. Total Employer/State Contribution Rate as of June 30, 2020, (3) + (4)(f)	75.46%	5.95%	81.41%

¹ Net effect of FY19 experience and assumption changes implemented effective June 30, 2019.

² Includes changes in future healthcare claims costs.

The following table shows the 2-year gain/(loss) on actuarial accrued liability as of June 30, 2020:

	Pension	Healthcare	Total
Retirement Experience	\$ (1,596,016)	\$ 341,768	\$ (1,254,248)
Termination Experience	534,735	(4,270)	530,465
Disability Experience	8,191	10,251	18,442
Active Mortality Experience	863,360	199,434	1,062,794
Inactive Mortality Experience	604,407	222,268	826,675
Salary Increases	(391,763)	N/A	(391,763)
New Entrants	(2,856,871)	(271,210)	(3,128,081)
Inactive Benefit Increases	(360,853)	N/A	(360,853)
Per Capita Claims Cost ¹	N/A	2,287,097	2,287,097
Cadillac Tax Repeal	N/A	234,431	234,431
Medicare Part B Only Experience	N/A	8,972	8,972
Programming Changes ²	(297,054)	N/A	(297,054)
Miscellaneous ³	<u>(583,293)</u>	<u>(488,418)</u>	<u>(1,071,711)</u>
Total	\$ (4,075,157)	\$ 2,540,323	\$ (1,534,834)

¹ Includes the estimated impact of COVID-19 on claims experience during FY20.

² Adjustments to required member contributions for service over 15 years.

³ Includes the effects of various data changes that are typical when new census data is received for the valuation, the effects of the differences between expected and actual benefit payments, and other items that do not fit neatly into any of the other categories.

Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued (Past Service) Liability
Active Members		
Retirement Benefits	\$ 91,303,811	\$ 50,226,222
Disability Benefits	160,359	4,327
Death Benefits	1,304,328	506,143
Termination Benefits ¹	3,057,538	90,662
Medical and Prescription Drug Benefits	12,431,669	5,742,731
Medicare Part D Subsidy	<u>(1,581,787)</u>	<u>(787,400)</u>
Subtotal	\$ 106,675,918	\$ 55,782,685
Benefit Recipients		
Retiree Benefits	\$ 161,847,552	\$ 161,847,552
Survivor Benefits	18,155,194	18,155,194
Disability Benefits	0	0
Medical and Prescription Drug Benefits	13,027,288	13,027,288
Medicare Part D Subsidy	<u>(1,984,248)</u>	<u>(1,984,248)</u>
Subtotal	\$ 191,045,786	\$ 191,045,786
Vested Terminations		
Deferred Retirement Benefits	\$ 2,449,368	\$ 2,449,368
Medical and Prescription Drug Benefits	628,029	628,029
Medicare Part D Subsidy	<u>(63,585)</u>	<u>(63,585)</u>
Subtotal	\$ 3,013,812	\$ 3,013,812
Non-Vested Terminations		
	\$ 66,828	\$ 66,828
Total	\$ 300,802,344	\$ 249,909,111
Total Pension	\$ 278,344,978	\$ 233,346,296
Total Medical, Net of Part D Subsidy	\$ 22,457,366	\$ 16,562,815
Total Medical, Gross of Part D Subsidy	\$ 26,086,986	\$ 19,398,048

¹ Includes return of contributions.

As of June 30, 2020

Normal Cost

Active Members

Retirement Benefits	\$	5,944,436
Disability Benefits		18,179
Death Benefits		126,399
Termination Benefits ¹		317,601
Medical and Prescription Drug Benefits		896,766
Medicare Part D Subsidy		(109,184)
Administrative Expenses (Pension)		83,000
Administrative Expenses (Medical)		24,000
Total	\$	7,301,197
Total Pension	\$	6,489,615
Total Medical, Net of Part D Subsidy	\$	811,582
Total Medical, Gross of Part D Subsidy	\$	920,766

¹ Includes return of contributions.

Section 1.2: Actuarial Contributions as of June 30, 2020 (for FY23)

Normal Cost Rate	Pension	Healthcare	Total
1. Total Normal Cost	\$ 6,489,615	\$ 811,582	\$ 7,301,197
2. Base Salaries for Upcoming Fiscal Year	13,633,248	13,633,248	13,633,248
3. Normal Cost Rate, (1) ÷ (2)	47.60%	5.95%	53.55%
4. Average Member Contribution Rate	6.25%	0.00%	6.25%
5. Employer Normal Cost Rate, (3) - (4)	41.35%	5.95%	47.30%

Past Service Rate	Pension	Healthcare	Total
1. Actuarial Accrued Liability	\$ 233,346,296	\$ 16,562,815	\$ 249,909,111
2. Valuation Assets	<u>194,788,043</u>	<u>34,805,639</u>	<u>229,593,682</u>
3. Unfunded Actuarial Accrued Liability, (1) - (2)	\$ 38,558,253	\$ (18,242,824)	\$ 20,315,429
4. Funded Ratio, (2) ÷ (1)	83.5%	210.1%	91.9%
5. Past Service Cost Amortization Payment	4,650,478	(1,097,006)	3,553,472
6. Base Salaries for Upcoming Fiscal Year	13,633,248	13,633,248	13,633,248
7. Past Service Rate, (5) ÷ (6)	34.11%	(8.05%)	26.06%
Total Employer Contribution Rate, not less than Normal Cost Rate	75.46%	5.95%	81.41%

Schedule of Past Service Cost Amortizations - Pension

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability ¹	6/30/2002	7	\$ 5,864,449	\$ 4,384,187	\$ 712,082
FY03/04 Loss ¹	6/30/2004	9	855,068	730,589	96,203
Revaluation of Liabilities ¹	6/30/2005	10	9,115,451	8,160,665	987,161
FY05/06 Loss ¹	6/30/2006	11	18,186,558	16,891,313	1,895,695
FY07 Loss	6/30/2007	12	1,364,721	1,305,006	136,992
FY08 Gain	6/30/2008	13	(29,014,739)	(28,400,811)	(2,807,678)
FY09 Loss	6/30/2009	14	21,273,454	21,192,254	1,984,432
Change in Assumptions	6/30/2010	15	13,976,981	14,100,026	1,256,823
FY10 Loss	6/30/2010	15	6,474,780	6,531,779	582,218
FY11 Loss	6/30/2011	16	7,397,917	7,541,369	642,636
FY12 Loss	6/30/2012	17	11,916,371	12,228,693	999,970
FY13 Loss	6/30/2013	18	7,033,497	6,997,991	550,946
Change in Assumptions	6/30/2014	19	4,219,851	4,346,623	330,439
FY14 Gain	6/30/2014	19	(14,458,986)	(14,893,369)	(1,132,223)
FY15 Gain	6/30/2015	20	(3,325,706)	(3,417,930)	(251,560)
FY16 Gain	6/30/2016	21	(9,932,623)	(10,161,088)	(725,736)
FY17 Gain	6/30/2017	22	(1,137,538)	(1,155,882)	(80,284)
Change in Assumptions	6/30/2018	23	10,343,783	10,419,795	705,155
FY18 Gain	6/30/2018	23	(12,096,419)	(12,185,312)	(824,636)
Change in Assumptions	6/30/2019	24	(14,775,890)	(14,841,835)	(980,341)
FY19 Loss	6/30/2019	24	3,344,559	3,359,485	221,902
FY20 Loss	6/30/2020	25	5,424,705	5,424,705	350,282
Total				\$ 38,558,253	\$ 4,650,478

¹ The pension and healthcare split was done based on the ratio of unfunded actuarial accrued liability as of June 30, 2006.

Schedule of Past Service Cost Amortizations - Healthcare

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability ¹	6/30/2002	7	\$ 2,295,257	\$ 1,715,906	\$ 278,698
FY03/04 Loss ¹	6/30/2004	9	334,660	285,940	37,652
Revaluation of Liabilities ¹	6/30/2005	10	3,567,649	3,193,959	386,360
FY05/06 Loss ¹	6/30/2006	11	7,117,943	6,611,004	741,946
FY07 Gain	6/30/2007	12	(810,073)	(774,628)	(81,316)
Change in Assumptions	6/30/2008	13	789,072	772,377	76,356
FY08 Gain	6/30/2008	13	(14,011,596)	(13,715,124)	(1,355,865)
FY09 Loss	6/30/2009	14	901,355	897,917	84,081
Change in Assumptions	6/30/2010	15	2,006,196	2,023,857	180,399
FY10 Gain	6/30/2010	15	(1,930,656)	(1,947,650)	(173,606)
FY11 Loss	6/30/2011	16	550,376	561,048	47,810
Change in Assumptions	6/30/2012	17	353,605	362,871	29,673
FY12 Gain	6/30/2012	17	(5,516,210)	(5,660,789)	(462,896)
FY13 Loss	6/30/2013	18	226,259	232,968	18,341
Change in Assumptions	6/30/2014	19	772,305	795,506	60,476
FY14 Gain	6/30/2014	19	(3,342,464)	(3,442,880)	(261,734)
FY15 Gain	6/30/2015	20	(1,416,996)	(1,456,290)	(107,183)
Change in Method	6/30/2016	21	(3,567,789)	(3,649,854)	(260,684)
FY16 Gain	6/30/2016	21	(425,711)	(435,503)	(31,105)
FY17 Gain	6/30/2017	22	(586,113)	(595,565)	(41,366)
Change in Assumptions/EGWP	6/30/2018	23	1,009,960	1,017,381	68,851
FY18 Gain	6/30/2018	23	(2,148,478)	(2,164,265)	(146,466)
Change in Assumptions	6/30/2019	24	126,754	127,319	8,410
FY19 Gain	6/30/2019	24	(155,028)	(155,719)	(10,286)
FY20 Gain	6/30/2020	25	(2,842,610)	(2,842,610)	(183,552)
Total				\$ (18,242,824)	\$ (1,097,006)

¹ The pension and healthcare split was done based on the ratio of unfunded actuarial accrued liability as of June 30, 2006.

Schedule of Past Service Cost Amortizations - Total

Layer	Amortization Period		Balances		Beginning-of-Year Payment
	Date Created	Years Remaining	Initial	Outstanding	
Initial Unfunded Liability	6/30/2002	7	\$ 8,159,706	\$ 6,100,093	\$ 990,780
FY03/04 Loss	6/30/2004	9	1,189,728	1,016,529	133,855
Revaluation of Liabilities	6/30/2005	10	12,683,100	11,354,624	1,373,521
FY05/06 Loss	6/30/2006	11	25,304,501	23,502,317	2,637,641
FY07 Loss	6/30/2007	12	554,648	530,378	55,676
Change in Assumptions	6/30/2008	13	789,072	772,377	76,356
FY08 Gain	6/30/2008	13	(43,026,335)	(42,115,935)	(4,163,543)
FY09 Loss	6/30/2009	14	22,174,809	22,090,171	2,068,513
Change in Assumptions	6/30/2010	15	15,983,177	16,123,883	1,437,222
FY10 Loss	6/30/2010	15	4,544,124	4,584,129	408,612
FY11 Loss	6/30/2011	16	7,948,293	8,102,417	690,446
Change in Assumptions	6/30/2012	17	353,605	362,871	29,673
FY12 Loss	6/30/2012	17	6,400,161	6,567,904	537,074
FY13 Loss	6/30/2013	18	7,259,756	7,230,959	569,287
Change in Assumptions	6/30/2014	19	4,992,156	5,142,129	390,915
FY14 Gain	6/30/2014	19	(17,801,450)	(18,336,249)	(1,393,957)
FY15 Gain	6/30/2015	20	(4,742,702)	(4,874,220)	(358,743)
Change in Method	6/30/2016	21	(3,567,789)	(3,649,854)	(260,684)
FY16 Gain	6/30/2016	21	(10,358,334)	(10,596,591)	(756,841)
FY17 Gain	6/30/2017	22	(1,723,651)	(1,751,447)	(121,650)
Change in Assumptions/EGWP	6/30/2018	23	11,353,743	11,437,176	774,006
FY18 Gain	6/30/2018	23	(14,244,897)	(14,349,577)	(971,102)
Change in Assumptions	6/30/2019	24	(14,649,136)	(14,714,516)	(971,931)
FY19 Loss	6/30/2019	24	3,189,531	3,203,766	211,616
FY20 Loss	6/30/2020	25	2,582,095	<u>2,582,095</u>	<u>166,730</u>
Total				\$ 20,315,429	\$ 3,553,472

Section 1.3: Actuarial Gain/(Loss) for FY20

	Pension	Healthcare	Total
1. Expected Actuarial Accrued Liability			
a. Actuarial Accrued Liability as of June 30, 2019	\$ 221,159,289	\$ 18,089,100	\$ 239,248,389
b. Normal Cost	6,077,783	819,372	6,897,155
c. Interest on (a) and (b) at 7.38%	16,770,096	1,395,445	18,165,541
d. Employer Group Waiver Plan	0	108,886	108,886
e. Benefit Payments	(14,178,500)	(1,267,667)	(15,446,167)
f. Refund of Contributions	0	0	0
g. Interest on (d) thru (f) at 7.38%, adjusted for timing	(557,529)	(41,998)	(599,527)
h. Assumptions/Methods Changes	0	0	0
i. Expected Actuarial Accrued Liability as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$ 229,271,139	\$ 19,103,138	\$ 248,374,277
2. Actual Actuarial Accrued Liability as of June 30, 2020	233,346,296	16,562,815	249,909,111
3. Liability Gain/(Loss), (1)(i) - (2)	\$ (4,075,157)	\$ 2,540,323	\$ (1,534,834)
4. Expected Actuarial Asset Value			
a. Actuarial Value of Assets as of June 30, 2019	\$ 186,117,830	\$ 33,319,896	\$ 219,437,726
b. Interest on (a) at 7.38%	13,735,496	2,459,008	16,194,504
c. Employee Contributions	838,676	0	838,676
d. Employer Contributions	6,117,144	730,363	6,847,507
e. State Appropriation	5,010,000	0	5,010,000
f. Employer Group Waiver Plan	0	108,886	108,886
g. Interest on (c) thru (f) at 7.38%, adjusted for timing	621,839	30,417	652,256
h. Benefit Payments	(14,178,500)	(1,267,667)	(15,446,167)
i. Refund of Contributions	0	0	0
j. Administrative Expenses	(106,618)	(29,092)	(135,710)
k. Interest on (h) thru (j) at 7.38%, adjusted for timing	(561,393)	(46,999)	(608,392)
l. Expected Actuarial Asset Value as of June 30, 2020 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h) + (i) + (j) + (k)	\$ 197,594,474	\$ 35,304,812	\$ 232,899,286
5. Actual Actuarial Asset Value as of June 30, 2020	194,788,043	34,805,639	229,593,682
6. Actuarial Asset Value Gain/(Loss), (5) - (4)(l)	\$ (2,806,431)	\$ (499,173)	\$ (3,305,604)
7. Total Actuarial Gain/(Loss), (3) + (6)	\$ (6,881,588)	\$ 2,041,150	\$ (4,840,438)
8. Contribution Gain/(Loss)	\$ 1,501,863	\$ 808,412	\$ 2,310,275
9. Administrative Expense Gain/(Loss)	\$ (44,980)	\$ (6,952)	\$ (51,932)
10. FY20 Gain/(Loss), (7) + (8) + (9)	\$ (5,424,705)	\$ 2,842,610	\$ (2,582,095)

Section 1.4: Development of Change in Unfunded Liability During FY20

	Pension	Healthcare	Total
1. 2019 Unfunded Liability	\$ 35,041,459	\$ (15,230,796)	\$ 19,810,663
a. Interest on Unfunded Liability at 7.38%	\$ 2,586,060	\$ (1,124,032)	\$ 1,462,028
b. Normal Cost	6,077,783	819,372	6,897,155
c. Employee Contributions	(838,676)	0	(838,676)
d. Employer Contributions	(6,117,144)	(730,363)	(6,847,507)
e. State Appropriation	(5,010,000)	0	(5,010,000)
f. Administrative Expenses	106,618	29,092	135,710
g. Interest on (b) thru (f) at 7.38%, adjusted for timing	(169,435)	35,053	(134,382)
h. Assumptions/Methods Changes	0	0	0
i. Expected Change in Unfunded Liability During FY20 (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$ (3,364,794)	\$ (970,878)	\$ (4,335,672)
2. Expected 2020 Unfunded Liability, (1) + (1)(i)	\$ 31,676,665	\$ (16,201,674)	\$ 15,474,991
a. Liability (Gain)/Loss During FY20	\$ 4,075,157	\$ (2,540,323)	\$ 1,534,834
b. Actuarial Assets (Gain)/Loss During FY20	2,806,431	499,173	3,305,604
c. Total Actuarial (Gain)/Loss During FY20	\$ 6,881,588	\$ (2,041,150)	\$ 4,840,438
3. Actual 2020 Unfunded Liability, (2) + (2)(c)	\$ 38,558,253	\$ (18,242,824)	\$ 20,315,429

Section 1.5: History of Unfunded Liability and Funded Ratio

Valuation Date	Total Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2000	\$ 73,483,475	\$ 72,660,197	98.9%	\$ 823,278
June 30, 2002	71,843,615	63,683,909	88.6%	8,159,706
June 30, 2004	80,052,559	70,455,634	88.0%	9,596,925
June 30, 2006	127,725,758	79,710,103	62.4%	48,015,655
June 30, 2007	133,988,906	84,773,226	63.3%	49,215,680
June 30, 2008	148,737,880	141,235,655	95.0%	7,502,225
June 30, 2009	156,679,506	127,173,616	81.2%	29,505,890
June 30, 2010	184,828,106	134,694,195	72.9%	50,133,911
June 30, 2011	194,831,317	136,546,204	70.1%	58,285,113
June 30, 2012	198,922,147	133,706,032	67.2%	65,216,115
June 30, 2013	209,088,146	136,738,696	65.4%	72,349,450
June 30, 2014	211,638,218	152,078,765	71.9%	59,559,453
June 30, 2015	223,465,344	168,991,184	75.6%	54,474,160
June 30, 2016	221,279,249	181,343,343	82.0%	39,935,906
June 30, 2017	233,547,391	196,344,239	84.1%	37,203,152
June 30, 2018	243,406,539	210,357,363	86.4%	33,049,176
June 30, 2019	239,248,389	219,437,726	91.7%	19,810,663
June 30, 2020	249,909,111	229,593,682	91.9%	20,315,429

Section 2: Plan Assets

Section 2.1: Summary of Fair Value of Assets

As of June 30, 2020	Pension	Healthcare	Total	Allocation Percent
Cash and Short-Term Investments				
- Cash and Cash Equivalents	\$ 2,148,409	\$ 359,625	\$ 2,508,034	1.1%
- Subtotal	\$ 2,148,409	\$ 359,625	\$ 2,508,034	1.1%
Fixed Income Investments				
- Domestic Fixed Income Pool	\$ 40,901,403	\$ 7,376,882	\$ 48,278,285	21.6%
- International Fixed Income Pool	0	0	0	0.0%
- Tactical Fixed Income Pool	0	0	0	0.0%
- High Yield Pool	0	0	0	0.0%
- Treasury Inflation Protection Pool	0	0	0	0.0%
- Emerging Debt Pool	0	0	0	0.0%
- Subtotal	\$ 40,901,403	\$ 7,376,882	\$ 48,278,285	21.6%
Equity Investments				
- Domestic Equity Pool	\$ 51,520,155	\$ 9,292,639	\$ 60,812,794	27.2%
- International Equity Pool	29,397,287	5,302,359	34,699,646	15.5%
- Private Equity Pool	23,312,273	4,204,811	27,517,084	12.3%
- Emerging Markets Equity Pool	6,147,320	1,108,786	7,256,106	3.2%
- Alternative Equity Strategies	10,254,995	1,849,683	12,104,678	5.4%
- Subtotal	\$ 120,632,030	\$ 21,758,278	\$ 142,390,308	63.8%
Other Investments				
- Real Estate Pool	\$ 11,604,002	\$ 2,097,294	\$ 13,701,296	6.1%
- Other Investments Pool	13,892,173	2,505,717	16,397,890	7.3%
- Absolute Return Pool	0	0	0	0.0%
- Other Assets	0	3,076	3,076	0.0%
- Subtotal	\$ 25,496,175	\$ 4,606,087	\$ 30,102,262	13.5%
Total Cash and Investments	\$ 189,178,017	\$ 34,100,872	\$ 223,278,889	100.0%
Net Accrued Receivables	666,008	(64,369)	601,639	
Net Assets	\$ 189,844,025	\$ 34,036,503	\$ 223,880,528	

Section 2.2: Changes in Fair Value of Assets During FY19

Fiscal Year 2019	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2018	\$ 176,794,969	\$ 31,497,603	\$ 208,292,572
2. Additions:			
a. Employee Contributions	\$ 813,374	\$ 0	\$ 813,374
b. Employer Contributions	5,347,675	591,397	5,939,072
c. State Appropriation	4,909,000	0	4,909,000
d. Interest and Dividend Income	3,305,189	589,436	3,894,625
e. Net Appreciation / Depreciation in Fair Value of Investments	7,216,458	1,324,956	8,541,414
f. Employer Group Waiver Plan	0	96,542	96,542
g. Other	0	2,291	2,291
h. Total Additions	\$ 21,591,696	\$ 2,604,622	\$ 24,196,318
3. Deductions:			
a. Medical Benefits	\$ 0	\$ 978,813	\$ 978,813
b. Retirement Benefits	13,627,946	0	13,627,946
c. Refund of Contributions	0	0	0
d. Investment Expenses	73,807	13,136	86,943
e. Administrative Expenses	59,094	17,950	77,044
f. Total Deductions	\$ 13,760,847	\$ 1,009,899	\$ 14,770,746
4. Fair Value of Assets as of June 30, 2019	\$ 184,625,818	\$ 33,092,326	\$ 217,718,144
5. Approximate Fair Value Investment Return Rate during FY19 Net of Investment Expenses	6.0%	6.1%	6.0%

Section 2.3: Changes in Fair Value of Assets During FY20

Fiscal Year 2020	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2019	\$ 184,625,818	\$ 33,092,326	\$ 217,718,144
2. Additions:			
a. Employee Contributions	\$ 838,676	\$ 0	\$ 838,676
b. Employer Contributions	6,117,144	730,363	6,847,507
c. State Appropriation	5,010,000	0	5,010,000
d. Interest and Dividend Income	2,862,234	510,170	3,372,404
e. Net Appreciation / Depreciation in Fair Value of Investments	5,220,577	962,611	6,183,188
f. Employer Group Waiver Plan	0	108,886	108,886
g. Other	0	23,956	23,956
h. Total Additions	<u>\$ 20,048,631</u>	<u>\$ 2,335,986</u>	<u>\$ 22,384,617</u>
3. Deductions:			
a. Medical Benefits	\$ 0	\$ 1,267,667	\$ 1,267,667
b. Retirement Benefits	14,178,500	0	14,178,500
c. Refund of Contributions	0	0	0
d. Investment Expenses	545,306	95,050	640,356
e. Administrative Expenses	<u>106,618</u>	<u>29,092</u>	<u>135,710</u>
f. Total Deductions	<u>\$ 14,830,424</u>	<u>\$ 1,391,809</u>	<u>\$ 16,222,233</u>
4. Fair Value of Assets as of June 30, 2020	\$ 189,844,025	\$ 34,036,503	\$ 223,880,528
5. Approximate Fair Value Investment Return Rate during FY20 Net of Investment Expenses	4.1%	4.3%	4.1%

Section 2.4: Development of Actuarial Value of Assets

Investment gains and losses are recognized 20% per year over 5 years. In no event may valuation assets be less than 80% or more than 120% of fair value as of the current valuation date.

	Pension	Healthcare	Total
1. Deferral of Investment Gain / (Loss) for FY20			
a. Fair Value of Assets as of June 30, 2019	\$ 184,625,818	\$ 33,092,326	\$ 217,718,144
b. Contributions	11,965,820	730,363	12,696,183
c. Employer Group Waiver Plan	0	108,886	108,886
d. Benefit Payments	14,178,500	1,267,667	15,446,167
e. Administrative Expenses	106,618	29,092	135,710
f. Actual Investment Return (net of investment expenses)	7,537,505	1,401,687	8,939,192
g. Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h. Expected Return, Weighted for Timing	13,685,832	2,425,632	16,111,464
i. Investment Gain / (Loss) for the Year, (f) - (h)	(6,148,327)	(1,023,945)	(7,172,272)
2. Actuarial Value as of June 30, 2020			
a. Fair Value as of June 30, 2020	\$ 189,844,025	\$ 34,036,503	\$ 223,880,528
b. Deferred Investment Gain / (Loss)	(4,944,018)	(769,136)	(5,713,154)
c. Preliminary Actuarial Value as of June 30, 2020, (a) - (b)	194,788,043	34,805,639	229,593,682
d. Upper Limit: 120% of Fair Value as of June 30, 2020	227,812,830	40,843,804	268,656,634
e. Lower Limit: 80% of Fair Value as of June 30, 2020	151,875,220	27,229,202	179,104,422
f. Actuarial Value at June 30, 2020, (c) limited by (d) and (e)	194,788,043	34,805,639	229,593,682
3. Ratio of Actuarial Value of Assets to Fair Value of Assets	102.6%	102.3%	102.6%
4. Approximate Actuarial Value Investment Return Rate during FY20 Net of Investment Expenses	5.9%	5.9%	5.9%

The tables below show the development of the gains/(losses) to be recognized in the current year:

Pension				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (12,208,288)	\$ (9,766,632)	\$ (2,441,656)	\$ 0
June 30, 2017	7,229,597	4,337,757	1,445,920	1,445,920
June 30, 2018	292,590	117,036	58,518	117,036
June 30, 2019	(2,647,188)	(529,438)	(529,438)	(1,588,312)
June 30, 2020	<u>(6,148,327)</u>	<u>0</u>	<u>(1,229,665)</u>	<u>(4,918,662)</u>
Total	\$ (13,481,616)	\$ (5,841,277)	\$ (2,696,321)	\$ (4,944,018)

Healthcare				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (2,359,113)	\$ (1,887,292)	\$ (471,821)	\$ 0
June 30, 2017	1,282,441	769,464	256,488	256,489
June 30, 2018	98,500	39,400	19,700	39,400
June 30, 2019	(409,783)	(81,957)	(81,957)	(245,869)
June 30, 2020	<u>(1,023,945)</u>	<u>0</u>	<u>(204,789)</u>	<u>(819,156)</u>
Total	\$ (2,411,900)	\$ (1,160,385)	\$ (482,379)	\$ (769,136)

Total				
Fiscal Year Ending	Asset Gain / (Loss)	Gain / (Loss) Recognized in Prior Years	Gain / (Loss) Recognized This Year	Gain / (Loss) Deferred to Future Years
June 30, 2016	\$ (14,567,401)	\$ (11,653,924)	\$ (2,913,477)	\$ 0
June 30, 2017	8,512,038	5,107,221	1,702,408	1,702,409
June 30, 2018	391,090	156,436	78,218	156,436
June 30, 2019	(3,056,971)	(611,395)	(611,395)	(1,834,181)
June 30, 2020	<u>(7,172,272)</u>	<u>0</u>	<u>(1,434,454)</u>	<u>(5,737,818)</u>
Total	\$ (15,893,516)	\$ (7,001,662)	\$ (3,178,700)	\$ (5,713,154)

Section 2.5: Historical Asset Rates of Return

Year Ending	Actuarial Value		Fair Value	
	Annual	Cumulative*	Annual	Cumulative*
June 30, 2005	8.0%	8.0%	8.0%	8.0%
June 30, 2006	11.0%	9.5%	11.0%	9.5%
June 30, 2007	10.2%	9.7%	18.1%	12.3%
June 30, 2008	7.4%	9.1%	(4.8%)	7.7%
June 30, 2009	(9.7%)	5.1%	(20.6%)	1.4%
June 30, 2010	8.7%	5.7%	10.6%	2.8%
June 30, 2011	5.0%	5.6%	20.8%	5.2%
June 30, 2012	0.7%	5.0%	0.1%	4.6%
June 30, 2013	3.6%	4.8%	12.3%	5.4%
June 30, 2014	12.2%	5.5%	18.3%	6.6%
June 30, 2015	10.8%	6.0%	3.0%	6.3%
June 30, 2016	6.6%	6.0%	(0.5%)	5.7%
June 30, 2017	8.3%	6.2%	13.0%	6.3%
June 30, 2018	8.1%	6.3%	8.3%	6.4%
June 30, 2019	5.7%	6.3%	6.0%	6.4%
June 30, 2020	5.9%	6.3%	4.1%	6.2%

* Cumulative since fiscal year ending June 30, 2005

Section 3: Member Data

Section 3.1: Summary of Members Included

As of June 30	2012	2014	2016	2018	2020
Active Members					
1. Number	69	76	76	71	72
2. Average Age	57.83	57.65	58.80	57.53	55.03
3. Average Service	9.04	8.70	9.39	9.49	6.83
4. Average Entry Age	48.79	48.95	49.41	48.04	48.20
5. Average Annual Base Pay	\$ 174,477	\$ 177,723	\$ 185,377	\$ 188,632	\$ 189,351
6. Number Vested	43	48	54	51	36
7. Percent Who Are Vested	62.3%	63.2%	71.1%	71.8%	50.0%
Retirees, Disabilitants, and Beneficiaries					
1. Number	108	108	109	125	144
2. Average Age	70.95	72.09	73.34	73.71	73.98
3. Average Monthly Pension Benefit	\$ 7,774	\$ 8,141	\$ 8,529	\$ 8,291	\$ 8,305
Vested Terminations (vested at termination, not refunded contributions, or commenced benefit)					
1. Number	5	4	3	3	2
2. Average Age	52.28	53.53	57.35	59.05	55.87
3. Average Monthly Pension Benefit	\$ 5,937	\$ 5,704	\$ 7,017	\$ 7,623	\$ 6,305
Non-Vested Terminations (not vested at termination, not refunded contributions)					
1. Number	0	0	0	0	1
2. Average Account Balance	\$ 0	\$ 0	\$ 0	\$ 0	\$ 66,828
Total Number of Members	182	188	188	199	219

As of June 30, 2020	Retirees
Summary of Retiree Medical Data Received	
1. Retiree records on pension data	144
2. Remove duplicates on pension data	(5)
3. Valued in a different retiree healthcare plan	(49)
4. Records without medical coverage	(1)
5. Total	<u>89</u>

Section 3.2: Age and Service Distribution of Active Members

Annual Earnings by Age

Age	Number	Total Annual Earnings	Average Annual Earnings
0 - 19	0	\$ 0	\$ 0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	2	350,568	175,284
40 - 44	9	1,653,852	183,761
45 - 49	10	1,814,700	181,470
50 - 54	17	3,084,996	181,470
55 - 59	12	2,147,736	178,978
60 - 64	11	2,029,176	184,471
65 - 69	11	2,076,144	188,740
70 - 74	0	0	0
75+	0	0	0
Total	72	\$ 13,157,172	\$ 182,739

Annual Earnings by Service

Years of Service	Number	Total Annual Earnings	Average Annual Earnings
0	8	\$ 1,460,016	\$ 182,502
1	14	2,598,336	185,595
2	6	1,051,704	175,284
3	5	923,844	184,769
4	3	584,616	194,872
0 - 4	36	\$ 6,618,516	\$ 183,848
5 - 9	16	2,914,848	182,178
10 - 14	12	2,205,480	183,790
15 - 19	6	1,051,704	175,284
20 - 24	2	366,624	183,312
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40+	0	0	0
Total	72	\$ 13,157,172	\$ 182,739

Years of Service by Age

Age	Years of Service									
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0	0
35 - 39	2	0	0	0	0	0	0	0	0	2
40 - 44	6	3	0	0	0	0	0	0	0	9
45 - 49	8	2	0	0	0	0	0	0	0	10
50 - 54	10	4	0	3	0	0	0	0	0	17
55 - 59	5	2	4	0	1	0	0	0	0	12
60 - 64	4	3	3	1	0	0	0	0	0	11
65 - 69	1	2	5	2	1	0	0	0	0	11
70 - 74	0	0	0	0	0	0	0	0	0	0
75+	0	0	0	0	0	0	0	0	0	0
Total	36	16	12	6	2	0	0	0	0	72

Section 3.3: Member Data Reconciliation

Pension

	Active Members	Inactive Members			Total
		Due a Refund	Deferred Benefits	Benefit Recipients	
As of June 30, 2018	71	0	3	125	199
New Entrants	22	0	0	0	22
Rehires	0	0	0	0	0
Vested Terminations	(1)	0	1	0	0
Non-Vested Terminations	(1)	1	0	0	0
Refund of Contributions	0	0	0	0	0
Retirements	(18)	0	(2)	20	0
Deceased	(1)	0	0	(8)	(9)
New Beneficiaries	0	0	0	6	6
New QDROs	0	0	0	2	2
Transfers In/Out	0	0	0	0	0
Data Corrections	0	0	0	(1)	(1)
Net Change	1	1	(1)	19	20
As of June 30, 2020	72	1	2	144	219

Healthcare

	Inactive Members					Total Inactive Members
	Active Members	Retirees	Covered Spouses	Covered Children / Dependents	Deferred	
As of June 30, 2018	56	78	40	5	3	126
New Entrants	13	0	0	0	0	0
Rehires	0	0	0	0	0	0
Vested Terminations	(1)	0	0	0	1	1
Non-Vested Terminations	(1)	0	0	0	0	0
Refund of Contributions	0	0	0	0	0	0
Disability Retirements	0	0	0	0	0	0
Age Retirements	(10)	10	4	0	0	14
Deferred Retirements	0	2	0	0	(2)	0
Deceased	(1)	(5)	0	0	0	(5)
New Beneficiaries	0	3	(3)	0	0	0
Added Retiree Medical Coverage	0	0	0	0	0	0
Added Dependent Coverage	0	0	0	0	0	0
Dropped Retiree Medical Coverage	0	0	0	0	0	0
Dropped Dependent Coverage	0	0	(2)	(1)	0	(3)
Transfers In/Out	0	1	0	0	0	1
Net Change	0	11	(1)	(1)	(1)	8
As of June 30, 2020	56	89	39	4	2	134

Section 4: Basis of the Actuarial Valuation

Section 4.1: Summary of Plan Provisions

Effective Date

May 4, 1963, with amendments through June 30, 2020.

Administration of Plan

The Commissioner of Administration is responsible for administering the Judicial Retirement System (JRS). The Alaska Retirement Management Board is responsible for managing and investing the fund.

Membership

Membership in JRS is mandatory for all Supreme Court justices and Superior, District, and Appellate Court judges. The administrative director of the Court System may elect to participate in either JRS or Public Employees' Retirement System (PERS).

Credited Service

Members receive credit for each day of JRS employment. Earlier service as a magistrate or deputy magistrate before July 1, 1967 is covered under JRS. JRS members become vested in the plan after completing five years of credited service.

Member Contributions

Mandatory Contributions: Members hired after July 1, 1978, are required to contribute 7% of their base salaries. Contributions are required for a maximum of 15 years. Members hired before July 1, 1978 are not required to contribute.

Interest: Members' contributions earn 4.5% interest, compounded semiannually on June 30 and December 31.

Refund of Contributions: Non-vested members may receive a refund of their contributions and interest earned if they terminate employment. Refunded contributions, plus 7% indebtedness interest, must be repaid before appointment to retirement.

JRS contributions for terminated members may be attached to satisfy claims under Alaska Statute 09.38.065 or federal tax levies. Contributions that are attached to satisfy claims or tax levies may be reinstated at any time. The member is not required to return to JRS employment.

Retirement Benefits

Normal Retirement: Members are eligible for normal retirement at age 60 if they have at least five years of JRS service. Terminated, vested members may defer retirement and begin receiving normal retirement benefits when they reach age 60. Vesting is completion of at least five years of JRS service.

Early Retirement: Members are eligible for early retirement at any age if they have at least 20 years of service. Terminated, vested members may defer retirement and begin receiving early retirement benefits when they reach age 55. Under early retirement, members receive reduced benefits equal to the actuarial equivalent of their normal retirement benefits. Early benefits are based on the member's service and early retirement date.

Benefit Type: Lifetime monthly benefits are paid to the member. Upon the member's death, a survivor's benefit (see below) may be payable if the member has an eligible spouse or dependent children.

Benefit Calculations for Normal Retirement: 5% of authorized monthly base salary for each year of JRS service up to a maximum of 15 years. JRS retirement benefit payments are recalculated when the salary for the office held by the member at the time of retirement changes. The maximum JRS benefit payable to a member is 75% of the authorized salary.

Disability Benefits

Members are eligible to receive monthly disability benefits at any age if they become incapacitated and they have at least two years of JRS service. Disability benefits are calculated the same as normal retirement benefits.

Survivor's Benefits

Survivor's benefits are payable to the spouse of a member if they have been married for at least one year immediately preceding the member's death and the member has at least two years of JRS service. The monthly survivor's benefit is equal to the greater of:

- a. 50% of the monthly benefit that the member would have received if retired at the time of death; or
- b. 30% of the authorized monthly base salary if the member was not eligible to retire, or was entitled to less than 60% of the authorized monthly base salary.

If there is no eligible surviving spouse, the member's dependent children receive, in equal shares, 50% of the benefit under (a) or (b) until age 19, or age 23 and attending an accredited educational or technical institution on a full-time basis.

When there is both an eligible surviving spouse and dependent children residing in separate households, the spouse and children share equally the benefit under (a) or (b) while the children are under age 19, or age 23 and attending an accredited educational or technical institution on a full-time basis.

When there is no surviving spouse or dependent children, the member's contribution account balance, including interest earned, will be paid to the designated beneficiary.

Postemployment Healthcare Benefits

Medical benefits are provided at no cost to JRS members, their spouses, and dependents while monthly retirement, disability, and survivor benefits are being paid.

Participants in the defined benefit plan are covered under the following benefit design:

Plan Feature	Amounts
Deductible (single/family)	\$150 / \$450
Coinsurance (most services)	20%
Outpatient surgery/testing	0%
Maximum Out-of-Pocket (single/family, excluding deductible)	\$800 / \$2,400
Rx Copays (generic/brand/mail-order), does not apply to OOP max	\$4 / \$8 / \$0
Lifetime Maximum	\$2,000,000

The plan coordinates with Medicare on a traditional Coordination of Benefits Method. Starting in 2019, the prescription drug coverage is through a Medicare Part D EGWP arrangement.

Changes in Benefit Provisions Valued Since the Prior Valuation

There were no changes in benefit provisions since the prior valuation.

Section 4.2: Description of Actuarial Methods and Valuation Procedures

The funding method used in this valuation was adopted by the Board in October 2006. Changes in methods were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017. The asset smoothing method used to determine valuation assets was changed effective June 30, 2014.

Benefits valued are those delineated in Alaska State statutes as of the valuation date. Changes in State statutes effective after the valuation date are not taken into consideration in setting the assumptions and methods.

Actuarial Cost Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method, level percent of pay.

Each year's difference between actual and expected unfunded actuarial accrued liability is amortized over 25 years as a level percent of expected payroll.

Projected pension and postemployment healthcare benefits were determined for all active members. Cost factors designed to produce annual costs as a constant percentage of each member's expected compensation in each year from the assumed entry age to the last age with a future benefit were applied to the projected benefits to determine the normal cost (the portion of the total cost of the plan allocated to the current year under the method). The normal cost is determined by summing intermediate results for active members and determining an average normal cost rate which is then related to the total payroll of active members. The actuarial accrued liability for active members (the portion of the total cost of the plan allocated to prior years under the method) was determined as the excess of the actuarial present value of projected benefits over the actuarial present value of future normal costs.

The actuarial accrued liability for retired members and their beneficiaries currently receiving benefits, terminated vested members and disabled members not yet receiving benefits was determined as the actuarial present value of the benefits expected to be paid. No future normal costs are payable for these members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date). The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of plan assets measured on the valuation date.

Under this method, experience gains or losses, i.e., decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

Valuation of Assets

The actuarial asset value was initialized to equal Fair Value of Assets as of June 30, 2006. Beginning in FY07, the asset valuation method recognizes 20% of the gain or loss each year, for a period of five years. All assets are valued at fair value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP. Valuation assets are constrained to a range of 80% to 120% of the fair value of assets.

Changes in Methods Since the Prior Valuation

There were no changes in the asset or valuation methods since the prior valuation.

Valuation of Retiree Medical and Prescription Drug Benefits

This section outlines the detailed methodology used in the internal model developed by Buck to calculate the initial per capita claims cost rates for the JRS postemployment healthcare plan. Note that the methodology reflects the results of our annual experience rate update for the period from July 1, 2019 to June 30, 2020.

Base claims cost rates are incurred healthcare costs expressed as a rate per member per year. Ideally, claims cost rates should be derived for each significant component of cost that can be expected to require differing projection assumptions or methods (i.e., medical claims, prescription drug claims, administrative costs, etc). Separate analysis is limited by the availability and historical credibility of cost and enrollment data for each component of cost. This valuation reflects non-prescription claims separated by Medicare status, including eligibility for free Part A coverage. Prescription costs are analyzed separately as in prior valuations. Administrative costs are assumed in the final per capita claims cost rates used for valuation purposes, as described below. Analysis to date on Medicare Part A coverage is limited since Part A claim data is not available by individual, nor is this status incorporated into historical claim data.

Benefits

Medical, prescription drug, dental, vision and audio coverage is provided through the AlaskaCare Retiree Health Plan and is available to employees of the State and subdivisions who meet retirement criteria based on the retirement plan tier in effect at their date of hire. Health plan provisions do not vary by retirement tier or age, except for Medicare coordination for those Medicare-eligible. Dental, vision and audio claims (DVA) are excluded from data analyzed for this valuation because those are retiree-pay all benefits where rates are assumed to be self-supporting. Buck relies upon rates set by a third-party for the DVA benefits. Buck reviewed historical rate-setting information and views contribution rate adjustments made are not unreasonable.

Administration and Data Sources

The plan was administered by Wells Fargo Insurance Services (acquired by HealthSmart, in January 2012) from July 1, 2009 through December 31, 2013 and by Aetna effective January 1, 2014.

Claims incurred for the period from July 2018 through June 2020 (FY19 through FY20) were provided by the State of Alaska from reports extracted from their data warehouse, which separated claims by Medicare status. Monthly enrollment data for the same period was provided by Aetna.

Aetna also provided census information identifying Medicare Part B only participants. These participants are identified when hospital claims are denied by Medicare; Aetna then flags that participant as a Part B only participant. Buck added newly identified participants to our list of Medicare Part B only participants. Buck assumes that once identified as Part B only, that participant remains in that status until we are notified otherwise.

Aetna provided a snapshot file as of July 1, 2020 of retirees and dependents that included a coverage level indicator. The monthly enrollment data includes double coverage participants. These are participants whereby both the retiree and spouse are retirees from the State and both are reflected with Couple coverage in the enrollment. In this case, such a couple would show up as four members in the monthly enrollment (each would be both a retiree and a spouse). As a result, the snapshot census file was used to adjust the total member counts in the monthly enrollment reports to estimate the number of unique participants enrolled in coverage. Based on the snapshot files from the last two valuations, the total member count in the monthly enrollment reports needs to be reduced by approximately 13% to account for the number of participants with double coverage.

Aetna does not provide separate experience by Medicare status in standard reporting so the special reports mentioned above from the data warehouse were used this year to obtain that information and incorporate it into the per capita rate development for each year of experience (with corresponding weights applied in the final per capita cost).

Methodology

Buck projected historical claim data to FY21 for retirees using the following summarized steps:

1. Develop historical annual incurred claim cost rates – an analysis of medical costs was completed based on claims information and enrollment data provided by the State of Alaska and Aetna for each year in the experience period of FY19 through FY20.
 - Costs for medical services and prescriptions were analyzed separately, and separate trend rates were developed to project expected future medical and prescription costs for the valuation year (e.g. from the experience period up through FY21).
 - Because the reports provided reflected incurred claims, no additional adjustment was needed to determine incurred claims to be used in the valuation.
 - An offset for costs expected to be reimbursed by Medicare was incorporated beginning at age 65. Alaska retirees who do not have 40 quarters of Medicare-covered compensation do not qualify for Medicare Part A coverage free of charge. This is a relatively small and closed group. Medicare was applied to State employment for all employees hired after March 31, 1986. For the “no-Part A” individuals who are required to enroll in Medicare Part B, the State is the primary payer for hospital bills and other Part A services. Claim experience is not available separately for participants with both Medicare Parts A and B and those with Part B only. For Medicare Part B only participants, a lower average claims cost was applied to retirees covered by both Medicare Part A and B vs. retirees covered only by Medicare Part B based upon manual rate models that estimate the Medicare covered proportion of medical costs. To the extent that no-Part A claims can be isolated and applied strictly to the appropriate closed group, actuarial accrued liability will be more accurate.
 - Based on census data received from Aetna, less than 1% of the current retiree population was identified as having coverage only under Medicare Part B. We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.
 - Based upon a reconciliation of valuation census data to the snapshot eligibility files provided by Aetna as of July 1, 2019, and July 1, 2020, Buck adjusted member counts used for duplicate records where participants have double coverage; i.e. primary coverage as a retiree and secondary coverage as the covered spouse of another retiree. This is to reflect the total cost per distinct individual/member which is then applied to distinct members in the valuation census.
 - Buck understands that pharmacy claims reported do not reflect rebates. Based on actual pharmacy rebate information provided by Aetna for years through 2018 and Optum for January 2019 through June 2020, rebates were assumed to be 17% of prescription drug claims for FY19 and 19.5% of prescription drug claims for FY20.
2. Develop estimated EGWP reimbursements – Segal provided estimated 2021 EGWP subsidies, developed with the assistance of OptumRx. These amounts are applicable only to Medicare-eligible participants.
3. Adjust for claim fluctuation, anomalous experience, etc. – explicit adjustments are often made for anticipated large claims or other anomalous experience. FY19 and FY20 experience were compared to assess the impact of COVID-19 and whether an adjustment to FY20 claims was indicated for use in the June 30, 2020 valuation. A material decrease in medical claims during March 2020 to June 2020 was experienced due to COVID-19. Therefore, an adjustment was made for those months to adjust for the decrease that is not expected to continue in future years. There was an observed spike in prescription drug claims in March 2020; however, the FY20 prescription drug experience appears reasonable to use without adjustment for COVID-19. To adjust for the decrease in medical claims due to COVID-19 during the last 4 months of FY20, the per capita cost during the first 8 months was used as the basis for estimating claims that would have occurred in the absence of COVID-19. Due to group size and demographics, we did not make any additional large claim adjustments. We do blend

both Alaska plan-specific and national trend factors as described below. Buck compared data utilized to lag reports and quarterly plan experience presentations provided by the State and Aetna to assess accuracy and reasonableness of data.

4. Trend all data points to the projection period – project prior years’ experience forward to FY21 for retiree benefits on an incurred claim basis. Trend factors derived from historical Alaska-specific experience and national trend factors are shown in the table in item 5 below.
5. Apply credibility to prior experience – adjust prior year’s data by assigning weight to recent periods, as shown at the right of the table below. The Board approved a change in the weighting of experience periods beginning with the June 30, 2017 valuation as outlined below. Note also that we averaged projected plan costs using Alaska-specific trend factors and national trend factors, assigning 75% weight to Alaska-specific trends and 25% to national trends:

Alaska-Specific and National Average Weighted Trend from Experience Period to Valuation Year			
Experience Period	Medical	Prescription	Weighting Factors
FY19 to FY20	7.3% Pre-Medicare / 4.6% Medicare	1.2%	50%
FY20 to FY21	6.3% Pre-Medicare / 5.2% Medicare	7.6%	50%

Trend assumptions used for rate development are assessed annually and as additional/improved reporting becomes available, we will incorporate into rate development as appropriate.

6. Develop separate administration costs – no adjustments were made for internal administrative costs. Third party retiree plan administration fees for FY21 are based upon total fees projected to 2021 by Segal based on actual FY20 fees. The annual per participant per year administrative cost rate for medical and prescription benefits is \$449.

Healthcare Reform

Healthcare Reform legislation passed on March 23, 2010 included several provisions with potential implications for the State of Alaska Retiree Health Plan liability. Buck evaluated the impact due to these provisions.

Because the State plan is retiree-only, and was in effect at the time the legislation was enacted, not all provisions of the health reform legislation apply to the State plan. Unlimited lifetime benefits and dependent coverage to age 26 are two of these provisions. We reviewed the impact of including these provisions, but there was no decision made to adopt them, and no requirement to do so.

Because Transitional Reinsurance fees are only in effect until 2016, we excluded these for valuation purposes.

The Further Consolidated Appropriations Act, 2020 passed in December 2019 repealed several healthcare-related taxes, including the Cadillac Tax. The valuation results included in the report reflect the repeal of this tax. The removal of the Cadillac Tax created an actuarial gain of approximately \$0.2 million.

The Tax Cuts and Jobs Act passed in December 2017 included the elimination of the individual mandate penalty and changed the inflation measure for purposes of determining the limits for the High Cost Excise Tax to use chained CPI. It is our understanding the law does not directly impact other provisions of the ACA. While the nullification of the ACA’s individual mandate penalty does not directly impact employer group health plans, it could contribute to the destabilization of the individual market and increase the number of uninsured. Such destabilization could translate to increased costs for employers. We have considered this when setting our healthcare cost trend assumptions and will continue to monitor this issue.

We have not identified any other specific provisions of healthcare reform or its potential repeal that would be expected to have a significant impact on the measured obligation. We will continue to monitor legislative activity.

Data

In accordance with actuarial standards, we note the following specific data sources and steps taken to value retiree medical benefits:

The Division of Retirement and Benefits provided pension valuation census data, which for people currently in receipt of healthcare benefits was supplemented by coverage data from the healthcare claims administrator (Aetna).

Certain adjustments and assumptions were made to prepare the data for valuation:

- Some records provided on the Aetna data were associated with a participant social security number not listed on the RIN-to-SSN translation file. We reconciled those participants with the pension valuation data as either a surviving spouse or a retiree in the appropriate plan based on account structure information in the Aetna data.
- All records provided with retiree medical coverage on the Aetna data were included in this valuation and we relied on the Aetna data as the source of medical coverage for current retirees and their dependents.
- Some records in the Aetna data were duplicates due to the double coverage (i.e. coverage as a retiree and as a spouse of another retiree) allowed under the plan. Records were adjusted for these members so that each member was only valued once. Any additional value of the double coverage (due to coordination of benefits) is small and reflected in the per capita costs.
- Covered children included in the Aetna data were valued until age 23, unless disabled. We assumed that those dependents over 23 were only eligible and valued due to being disabled.
- For individuals included in the pension data expecting a future pension, we valued health benefits starting at the same point that the pension benefit is assumed to start.

We are not aware of any other data issues that would be expected to have a material impact on the results and there are no unresolved matters related to the data.

The chart below shows the basis of setting the per capita claims cost assumption, which includes PERS, TRS, and JRS.

	Medical		Prescription Drugs (Rx)	
	Pre-Medicare	Medicare	Pre-Medicare	Medicare
A. Fiscal 2019				
1. Incurred Claims	\$ 230,731,518	\$ 80,855,220	\$ 63,846,605	\$ 183,281,273
2. Adjustments for Rx Rebates	0	0	(10,853,923)	(31,157,816)
3. Net incurred claims	\$ 230,731,518	\$ 80,855,220	\$ 52,992,682	\$ 152,123,456
4. Average Enrollment	20,625	42,843	20,625	42,843
5. Claim Cost Rate (3) / (4)	11,187	1,887	2,569	3,551
6. Trend to Fiscal 2021	1.141	1.101	1.089	1.089
7. Fiscal 2021 Incurred Cost Rate (5) x (6)	\$ 12,762	\$ 2,077	\$ 2,798	\$ 3,867
B. Fiscal 2020				
1. Incurred Claims	\$ 229,531,664	\$ 89,497,345	\$ 64,442,660	\$ 188,022,328
2. Adjustments for Rx Rebates	0	0	(12,566,319)	(36,664,354)
3. Net incurred claims	\$ 229,531,664	\$ 89,497,345	\$ 51,876,341	\$ 151,357,974
4. Average Enrollment	19,354	44,965	19,354	44,965
5. Claim Cost Rate (3) / (4)	11,860	1,990	2,680	3,366
6. Trend to Fiscal 2021	1.063	1.052	1.076	1.076
7. Fiscal 2021 Incurred Cost Rate (5) x (6)	\$ 12,609	\$ 2,094	\$ 2,885	\$ 3,623
C. Incurred Cost Rate by Fiscal Year				
1. Fiscal 2019 A.(7)	12,762	2,077	2,798	3,867
2. Fiscal 2020 B.(7)	12,609	2,094	2,885	3,623
D. Weighting by Fiscal Year				
1. Fiscal 2019	50%	50%	50%	50%
2. Fiscal 2020	50%	50%	50%	50%
E. Fiscal 2021 Incurred Cost Rate				
1. Rate at Average Age C x D	\$ 12,685	\$ 2,086	\$ 2,842	\$ 3,745
2. Average Aging Factor	0.826	1.263	0.838	1.121
3. Rate at Age 65 (1) / (2)	\$ 15,360	\$ 1,651	\$ 3,393	\$ 3,340
F. Development of Part A&B and Part B Only Cost from Pooled Rate Above				
1. Part A&B Average Enrollment		44,568		
2. Part B Only Average Enrollment		398		
3. Total Medicare Average Enrollment B(4)		44,965		
4. Cost ratio for those with Part B only to those with Parts A&B		3.300		
5. Factor to determine cost for those with Parts A&B (2) / (3) x (4) + (1) / (3) x 1.00		1.020		
6. Medicare per capita cost for all participants: E(3)		\$ 1,651		
7. Cost for those eligible for Parts A&B: (6) / (5)		\$ 1,618		
8. Cost for those eligible for Part B only: (7) x (4)		\$ 5,340		

Following the development of total projected costs, a distribution of per capita claims cost was developed. This was accomplished by allocating total projected costs to the population census used in the valuation. The allocation was done separately for each of prescription drugs and medical costs for the Medicare eligible and pre-Medicare populations. The allocation weights were developed using participant counts by age and assumed morbidity and aging factors. Results were tested for reasonableness based on historical trend and external benchmarks for costs paid by Medicare.

Below are the results of this analysis:

**Distribution of Per Capita Claims Cost by Age
for the Period July 1, 2020 through June 30, 2021**

Age	Medical and Medicare Parts A & B	Medical and Medicare Part B Only	Prescription Drug	Medicare EGWP Subsidy
45	\$ 9,374	\$ 9,374	\$ 2,072	\$ 0
50	10,605	10,605	2,461	0
55	11,999	11,999	2,923	0
60	13,576	13,576	3,149	0
65	1,618	5,340	3,340	1,003
70	1,876	6,191	3,688	1,107
75	2,174	7,177	4,071	1,223
80	2,401	7,923	3,971	1,192

Section 4.3: Summary of Actuarial Assumptions

The demographic and economic assumptions used in the June 30, 2020 valuation are described below. Unless noted otherwise, these assumptions were adopted by the Board in January 2019 based on the experience study for the period July 1, 2013 to June 30, 2017.

Investment Return

7.38% per year, net of investment expenses.

Salary Scale

3.62% per year.

Payroll Growth

2.75% per year (inflation + productivity).

Total Inflation

Total inflation as measured by the Consumer Price Index for urban and clerical workers for Anchorage is assumed to increase 2.50% annually.

Compensation and Benefit Limit Increases

Compensation is limited to the IRC 401(a)(17) amount, which was \$285,000 for 2020. This limit is assumed to increase 2.50% each year thereafter.

Benefits are limited to the IRC 415 amount, which was \$230,000 for 2020. This limit is assumed to increase 2.50% each year thereafter.

Benefit Payment Increases

Benefits for retired members are assumed to increase 3.62% per year.

Mortality (Pre-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

RP-2014 white-collar employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Mortality (Post-Commencement)

Mortality rates based upon the 2013-2017 actual experience.

93% of male and 90% of female rates of RP-2014 white-collar healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Turnover

Select rate of 3% for service less than 10 years, with an ultimate rate of 1% thereafter. Turnover rates cease once a member is eligible for retirement.

Disability

Incidence rates as shown in Table 1.

Post-disability mortality in accordance with the RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Retirement

Retirement rates as shown in see Table 2.

Deferred vested members are assumed to retire at age 60.

Form of Payment

Married members are assumed to elect the 50% Joint and Survivor benefit option. Single members are assumed to elect the Modified Cash Refund Annuity.

Spouse Age Difference

Males are assumed to be four years older than their wives. Females are assumed to be four years younger than husbands.

Percent Married for Pension

90% of male members and 70% of female members are assumed to be married at termination from active service.

Dependent Spouse Medical Coverage Election

Applies to members who do not have double medical coverage. 90% of male members and 70% of female members are assumed to be married and cover a dependent spouse.

Dependent Children

- Pension: None.
- Healthcare: Benefits for dependent children have been valued only for members currently covering their dependent children. These benefits are only valued through the dependent children's age 23 (unless the child is disabled).

Contribution Refunds

0% of terminating members with vested benefits are assumed to have their contributions refunded. 100% of those with non-vested benefits are assumed to have their contributions refunded.

Imputed Data

Data changes from the prior year which are deemed to have an immaterial impact on liabilities and contribution rates are assumed to be correct in the current year's client data. Non-vested terminations with appropriate refund dates are assumed to have received a full refund of contributions. Active members with missing salary and service are assumed to be terminated with status based on their vesting percentage.

Expenses

The investment return assumption is net of investment expenses. The Normal Cost as of June 30, 2020 was increased by the following amounts for administrative expenses:

- Pension: \$83,000
- Healthcare: \$24,000

Per Capita Claims Cost

Sample claims cost rates adjusted to age 65 for FY21 medical and prescription drugs are shown below:

	Medical	Prescription Drugs
Pre-Medicare	\$ 15,360	\$ 3,393
Medicare Parts A & B	\$ 1,618	\$ 3,340
Medicare Part B Only	\$ 5,340	\$ 3,340
Medicare Part D – EGWP	N/A	\$ 1,003

Members are assumed to attain Medicare eligibility at age 65. All costs are for the 2021 fiscal year (July 1, 2020 – June 30, 2021).

The EGWP subsidy is assumed to increase in future years by the trend rates shown on the following pages. No future legislative changes or other events are anticipated to impact the EGWP subsidy. If any legislative or other changes occur in the future that impact the EGWP subsidy (which could either increase or decrease the plan's Actuarial Accrued Liability), those changes will be evaluated and quantified when they occur.

Third Party Administrator Fees

\$449 per person per year; assumed to increase at 4.5% per year.

Medicare Part B Only

We assume that 5% of actives hired before April 1, 1986 and current retirees who are not yet Medicare eligible will not be eligible for Medicare Part A.

Healthcare Cost Trend

The table below shows the rate used to project the cost from the shown fiscal year to the next fiscal year. For example, 6.5% is applied to the FY21 pre-Medicare medical claims costs to get the FY22 medical claims costs.

	Medical Pre-65	Medical Post-65	Prescription Drugs / EGWP
FY21	6.5%	5.4%	7.5%
FY22	6.3%	5.4%	7.1%
FY23	6.1%	5.4%	6.8%
FY24	5.9%	5.4%	6.4%
FY25	5.8%	5.4%	6.1%
FY26	5.6%	5.4%	5.7%
FY27-FY40	5.4%	5.4%	5.4%
FY41	5.3%	5.3%	5.3%
FY42	5.2%	5.2%	5.2%
FY43	5.1%	5.1%	5.1%
FY44	5.1%	5.1%	5.1%
FY45	5.0%	5.0%	5.0%
FY46	4.9%	4.9%	4.9%
FY47	4.8%	4.8%	4.8%
FY48	4.7%	4.7%	4.7%
FY49	4.6%	4.6%	4.6%
FY50+	4.5%	4.5%	4.5%

For the June 30, 2014 valuation and later, the updated Society of Actuaries' Healthcare Cost Trend Model is used to project medical and prescription drug costs. This model estimates trend amounts that are projected out for 80 years. The model has been populated with assumptions that are specific to the State of Alaska.

Aging Factors

Age	Medical	Prescription Drugs
0 – 44	2.0%	4.5%
45 – 54	2.5%	3.5%
55 – 64	2.5%	1.5%
65 – 74	3.0%	2.0%
75 – 84	2.0%	-0.5%
85 – 94	0.3%	-2.5%
95+	0.0%	0.0%

Healthcare Participation

100% of system paid members and their spouses are assumed to elect healthcare benefits as soon as they are eligible.

Changes in Assumptions Since the Prior Valuation

Healthcare claim costs are updated annually as described in Section 4.2. The Further Consolidated Appropriations Act, 2020 that was signed in December 2019 made several changes, including the repeal of the Cadillac Tax. The repeal of the Cadillac Tax reduced the plan's liabilities as of June 30, 2020 by approximately \$0.2 million. The amounts included in the Normal Cost for administrative expenses were changed from \$71,050 to \$83,000 for pension and from \$19,250 to \$24,000 for healthcare (based on the most recent two years of actual administrative expenses paid from plan assets).

Table 1: Disability Rates

Age	Rate	Age	Rate
20	0.017%	40	0.029%
21	0.017	41	0.030
22	0.018	42	0.032
23	0.018	43	0.034
24	0.018	44	0.037
25	0.019	45	0.041
26	0.019	46	0.044
27	0.019	47	0.048
28	0.020	48	0.052
29	0.020	49	0.056
30	0.021	50	0.060
31	0.021	51	0.065
32	0.022	52	0.072
33	0.022	53	0.080
34	0.023	54	0.089
35	0.024	55	0.100
36	0.025	56	0.115
37	0.026	57	0.134
38	0.027	58	0.153
39	0.028	59	0.180
		60+	0.000

Table 2: Retirement Rates

Age	Rate
< 59	3%
59	10
60	20
61	20
62	10
63	10
64	10
65	20
66	20
67	10
68	10
69	10
70+	100

Section 5: Actuarial Standard of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important.

Actuarial Standard of Practice No. 51 (ASOP 51)¹ requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement, and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plan's future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the 7.38% expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk – potential that future salaries will be different than expected in the actuarial valuation
- Inflation Risk – potential that the consumer price index (CPI) for urban wage earners and clerical workers for Anchorage is different than the 2.5% assumed in the valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

¹ ASOP 51 does not apply to the healthcare portion of the plan. Accordingly, all figures in this section relate to the pension portion.

Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.5 of this report. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plan when the employer's and/or State's actual contribution amount and the actuarially determined contribution differ.

- If the actual contribution is lower than the actuarially determined contribution, the plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).
- As long as the Board consistently adopts the actuarially determined contributions, this risk is mitigated due to Alaska statutes requiring the State to contribute additional funds necessary to pay the total contributions adopted by the Board.

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plan's asset allocation will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase actuarial accrued liability by approximately 11%.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plan could increase.
- The mortality assumption for the plan mitigates this risk by assuming future improvement in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the plan.
- The plan provides cost-of-living adjustments on retirement benefits (based on salary changes of sitting judges) that increase longevity risk, because members who live longer than expected will incur more benefit payment increases than expected and therefore increase costs.

Salary Increase Risk

Plan costs will be increased if actual salary increases are larger than expected.

- Higher-than-expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Inflation Risk

Inflation risk may be associated with the interaction of inflation with other assumptions, but this is not significant as a standalone assumption, and therefore is considered as part of the associated assumption risk instead of being discussed here.

Other Demographic Risk

The plan is subject to risks associated with other demographic assumptions (e.g., retirement and termination rates). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plan. The demographic assumptions used in the valuation are re-evaluated regularly as part of the four-year experience studies to ensure the assumptions are consistent with long-term expectations.

Historical Information

Monitoring certain information over time may help understand risks faced by the plan. Historical information is included throughout this report. Some examples are:

- Section 1.5 shows how the plan's funded status (comparison of actuarial accrued liabilities to actuarial value of assets) has changed over time.
- Section 2.5 shows the volatility of asset returns over time.
- Section 3 includes various historical information showing how member census data has changed over time.

Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability	June 30, 2018	June 30, 2020
1. Retiree and Beneficiary Accrued Liability	\$ 156,622,684	\$ 180,002,746
2. Total Accrued Liability	\$ 226,559,580	\$ 233,346,296
3. Ratio, (1) ÷ (2)	69.1%	77.1%

A high percentage of liability concentrated on participants in pay status indicates a mature plan (often a ratio above 60% - 65%). An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption and increased costs. Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions creating an increased reliance on investment returns. This ratio should be monitored each year in the future.

Ratio of Cash Flow to Assets	FYE June 30, 2018	FYE June 30, 2020
1. Contributions	\$ 11,360,677	\$ 11,965,820
2. Benefit Payments	<u>12,125,563</u>	<u>14,178,500</u>
3. Cash Flow, (1) - (2)	\$ (764,886)	\$ (2,212,680)
4. Fair Value of Assets	\$ 176,794,969	\$ 189,844,025
5. Ratio, (3) ÷ (4)	(0.4%)	(1.2%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the trust. Negative cash flow indicates the trust needs to rely on investment returns to cover benefit payments and / or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which can increase the investment risk. Currently, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. This maturity measure should be monitored in the future.

Contribution Volatility	June 30, 2018	June 30, 2020
1. Fair Value of Assets	\$ 176,794,969	\$ 189,844,025
2. Payroll	\$ 13,392,864	\$ 13,633,248
3. Asset to Payroll Ratio, (1) ÷ (2)	1,320.1%	1,392.5%
4. Accrued Liability	\$ 226,559,580	\$ 233,346,296
5. Liability to Payroll Ratio, (4) ÷ (2)	1,691.6%	1,711.6%

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10% may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5%. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent, the plan with a liability-to-payroll ratio of 10% may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5%.

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension or postemployment benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension or postemployment plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension or postemployment benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

GASB 67 and 68

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013 and defines new financial reporting requirements for public pension plans.

Governmental Accounting Standards Board Statement Number 68 amends Number 27 effective for fiscal years beginning after June 15, 2014 and defines new accounting and financial reporting requirements for employers sponsoring public pension plans.

GASB 74 and 75

Governmental Accounting Standards Board Statement Number 74 amends Number 43 effective for the fiscal year beginning after June 15, 2016 and defines new financial reporting requirements for public postemployment benefit plans.

Governmental Accounting Standards Board Statement Number 75 amends Number 45 effective for fiscal years beginning after June 15, 2017 and defines new accounting and financial reporting requirements for employers sponsoring public postemployment benefit plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.

DRAFT



State of Alaska

National Guard and Naval Militia Retirement System

Actuarial Valuation Report
As of June 30, 2020

February 2021

DRAFT



February 26, 2021

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Certification of Actuarial Valuation

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

This report summarizes the actuarial valuation results of the State of Alaska National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2020 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on financial information provided in the financial statements audited by KPMG LLP, and member data provided by the Division of Retirement and Benefits as summarized in this report. The benefits considered are those delineated in Alaska statutes effective June 30, 2020. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under NGNMRS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of NGNMRS as of June 30, 2020.

The contribution requirements reflect the cost of benefits accruing in the upcoming year, administrative expenses expected to be paid from the trust, and a level dollar amortization of the initial unfunded actuarial accrued liability and subsequent gains/losses over a period of 20 years less average military service of active members. The contribution levels are recommended by the actuary and adopted by the Board each year. This objective is currently being met and is projected to continue to be met. Absent future gains/losses, actuarially determined contributions are expected to remain zero and the funded status is expected to remain at or above 100%.

The Board and staff of the State of Alaska may use this report for the review of the operations of NGNMRS. Use of this report for any other purpose or by anyone other than the Board or staff of the State of Alaska may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods or inapplicability of the report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without the review by Buck.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for

these measurements, and changes in plan provisions or applicable law. An analysis of the potential range of such future differences is beyond the scope of this valuation.

In my opinion, the actuarial assumptions used are reasonable, taking into account the experience of the plan and reasonable long-term expectations, and represent my best estimate of the anticipated long-term experience under the plan. The actuary performs an analysis of plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The last full experience analysis was performed for the period July 1, 2013 to June 30, 2017. Based on that experience study, the Board adopted new assumptions effective beginning with the June 30, 2018 valuation to better reflect expected future experience. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Sections 4.2 and 4.3.

Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67) was effective for NGNMRS beginning with fiscal year ending June 30, 2014. A separate GASB 67 report as of June 30, 2020 has been prepared. We have also prepared the member data tables shown in Section 3 of this report for the Statistical Section of the CAFR, as well as the summary of actuarial assumptions and analysis of financial experience for the Actuarial Section of the CAFR. Please see our separate GASB 67 report for other information needed for the CAFR.

Assessment of Risks

Actuarial Standard of Practice No. 51 (ASOP 51) applies to actuaries performing funding calculations related to a pension plan. See Section 5 of this report for further details regarding ASOP 51.

Use of Models

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in this report. The output from the third-party vendor software is used as input to internally developed models that apply applicable funding methods and policies to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal models are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding methods, as well as the manner in which the model generates its output. If significant changes are made to the internal models, extra checking and review are completed. Significant changes to the internal models that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

This report was prepared under my supervision and in accordance with all applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries, an Enrolled Actuary, a Fellow of the Conference of Consulting Actuaries and a Member of the American Academy of Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available to discuss this report with you at your convenience. I can be reached at (602) 803-6174.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "D. J. Kershner", is written over a light gray rectangular background.

David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

Contents

- Executive Summary1**
- Section 1: Actuarial Funding Results4**
 - Section 1.1: Actuarial Liabilities and Normal Cost4
 - Section 1.2: Actuarial Contributions as of June 30, 2020 (for FY23).....5
 - Section 1.3: Actuarial Gain/(Loss) for FY20.....6
 - Section 1.4: Development of Change in Unfunded Liability during FY207
 - Section 1.5: History of Unfunded Liability and Funded Ratio8
- Section 2: Plan Assets.....9**
 - Section 2.1: Summary of Fair Value of Assets9
 - Section 2.2: Changes in Fair Value of Assets.....10
 - Section 2.3: Development of Actuarial Value of Assets.....11
 - Section 2.4: Historical Asset Rates of Return12
- Section 3: Member Data13**
 - Section 3.1: Summary of Members Included13
 - Section 3.2(a): Age and Service Distributions of Active Members – All Actives.....14
 - Section 3.2(b): Age and Service Distributions of Active Members – Air Actives15
 - Section 3.2(c): Age and Service Distributions of Active Members – Army Actives16
 - Section 3.2(d): Age and Service Distributions of Active Members – Navy Actives17
 - Section 3.3: Member Data Reconciliation18
- Section 4: Basis of the Actuarial Valuation.....19**
 - Section 4.1: Summary of Plan Provisions.....19
 - Section 4.2: Description of Actuarial Methods and Valuation Procedures.....21
 - Section 4.3: Summary of Actuarial Assumptions22
- Section 5: Actuarial Standards of Practice No. 5124**
- Glossary of Terms.....27**

Executive Summary

Overview

The State of Alaska National Guard and Naval Militia Retirement System (NGNMRS) provides pension benefits to the National Guard, naval militia and other eligible members. The Commissioner of the Department of Administration is responsible for administering the plan. The Alaska Retirement Management Board has fiduciary responsibility over the assets of the plan. This report presents the results of the actuarial valuation of NGNMRS as of the valuation date of June 30, 2020.

Purpose

An actuarial valuation is performed on the plan once every two years as of the end of the fiscal year, and roll-forward valuations are performed every other year. The main purposes of the actuarial valuation detailed in this report are:

1. To determine the Employer contribution necessary to meet the Board's funding policy for the plan;
2. To disclose the funding assets and liability measures as of the valuation date;
3. To review the current funded status of the plan and assess the funded status as an appropriate measure for determining future actuarially determined contributions;
4. To compare actual and expected experience under the plan during the fiscal year; and
5. To report trends in contributions, assets, liabilities, and funded status over the last several years.

The actuarial valuation provides a “snapshot” of the funded position of NGNMRS based on the plan provisions, membership data, assets, and actuarial methods and assumptions as of the valuation date.

Funded Status

Where presented, references to “funded ratio” and “unfunded actuarial accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded actuarial accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Funded Status as of June 30	2018	2020
a. Actuarial Accrued Liability	\$ 21,934,014	\$ 22,417,247
b. Valuation Assets	<u>41,031,353</u>	<u>43,020,393</u>
c. Unfunded Actuarial Accrued Liability, (a) – (b)	\$ (19,097,339)	\$ (20,603,146)
d. Funded Ratio based on Valuation Assets, (b) ÷ (a)	187.1%	191.9%
e. Fair Value of Assets	\$ 39,418,117	\$ 42,095,708
f. Funding Ratio based on Fair Value of Assets, (e) ÷ (a)	179.7%	187.8%

Actuarially Determined Contribution Amounts	FY21	FY23
a. Normal Cost	\$ 483,551	\$ 503,140
b. Past Service Cost	(2,988,961)	(3,224,638)
c. Expense Load	<u>242,000</u>	<u>256,000</u>
d. Total Annual Contribution, (a) + (b) + (c), not less than 0	\$ 0	\$ 0

The Actuarially Determined Contribution amount for FY22 based on a roll-forward valuation as of June 30, 2019 was \$0.

The key reasons for the change in funded status are described below:

1. Investment Experience

The approximate investment returns based on fair value of assets were 5.9% for FY19 and 5.3% for FY20, compared to the expected investment return of 7.00% (net of investment expenses). This resulted in market asset losses of approximately \$0.4 million for FY19 and \$0.7 million for FY20. Due to the recognition of investment gains and losses over a 5-year period, the investment returns based on actuarial value of assets were approximately 4.1% for FY19 and 5.1% for FY20.

2. Demographic Experience

Section 3 provides statistics on active and inactive participants. The number of active participants increased from 3,777 at June 30, 2018 to 3,934 at June 30, 2020. The average age of active participants increased from 33.92 to 34.20, and average credited service increased from 6.69 years to 6.87 years.

The number of retirees and QDROs decreased from 752 to 708, and their average age decreased from 59.18 to 58.83.

The number of vested terminated participants increased from 588 to 649, and their average age increased from 56.10 to 57.00.

The overall effect of the demographic experience was a liability gain of approximately \$49,000 (approximately 0.2% of the expected liability).

3. Changes in Methods Since the Prior Valuation

There were no changes in actuarial methods since the prior valuation.

4. Changes in Assumptions Since the Prior Valuation

The amount included in the Normal Cost for administrative expenses was changed from \$242,000 at June 30, 2018 to \$256,000 at June 30, 2020.

5. Changes in Benefit Provisions Since the Prior Valuation

There were no changes in benefit provisions since the prior valuation.

Section 1: Actuarial Funding Results

Section 1.1: Actuarial Liabilities and Normal Cost

As of June 30, 2020	Present Value of Projected Benefits	Actuarial Accrued Liability
Active Members		
Retirement Benefits	\$ 12,348,831	\$ 9,756,772
Termination Benefits	0	0
Death Benefits	270,264	194,224
Disability Benefits	<u>120,136</u>	<u>95,473</u>
Subtotal	\$ 12,739,231	\$ 10,046,469
Inactive Members		
Vested Terminated	\$ 6,562,774	\$ 6,562,774
Retirees (including QDROs)	<u>5,808,004</u>	<u>5,808,004</u>
Subtotal	\$ 12,370,778	\$ 12,370,778
Total	\$ 25,110,009	\$ 22,417,247

As of June 30, 2020	Normal Cost
Active Members	
Retirement Benefits	\$ 484,418
Termination Benefits	0
Death Benefits	14,108
Disability Benefits	<u>4,614</u>
Subtotal	\$ 503,140
Expense Load	
Administrative Expense	\$ 256,000
Total	\$ 759,140

Section 1.2: Actuarial Contributions as of June 30, 2020 (for FY23)



1. Actuarial Accrued Liability	\$ 22,417,247
2. Valuation Assets	<u>43,020,393</u>
3. Total Unfunded Actuarial Accrued Liability, (1) – (2)	\$ (20,603,146)
4. Past Service Cost Amortization Payment ¹	(3,224,638)
5. Normal Cost, including Expense Load	<u>759,140</u>
6. Total Contribution, (4) + (5), not less than 0	\$ 0

¹ Calculated on a level dollar basis over an 8-year period as of June 30, 2020.

Section 1.3: Actuarial Gain/(Loss) for FY20

1. Expected Actuarial Accrued Liability		
a. Actuarial Accrued Liability, June 30, 2019	\$	22,592,882
b. Normal Cost for FY20		483,551
c. Interest on (a) and (b) at 7.00%		1,615,350
d. Benefit Payments for FY20		(1,641,475)
e. Interest on (d) at 7.00%, adjusted for timing		(61,273)
f. Change in Actuarial Assumptions		<u>0</u>
g. Expected Actuarial Accrued Liability as of June 30, 2020, (a) + (b) + (c) + (d) + (e) + (f)	\$	22,989,035
2. Actual Actuarial Accrued Liability, June 30, 2020		<u>22,417,247</u>
3. Liability Gain/(Loss), (1)(g) – (2)	\$	571,788¹
4. Expected Actuarial Asset Value		
a. Actuarial Asset Value, June 30, 2019	\$	41,939,204
b. Interest on (a) at 7.00%		2,935,744
c. Employer Contributions for FY20		860,686
d. Interest on (c) at 7.00%, adjusted for timing		29,615
e. Benefit Payments for FY20		(1,641,475)
f. Interest on (e) at 7.00%, adjusted for timing		(61,273)
g. Administrative Expenses for FY20		(230,609)
h. Interest on (g) at 7.00%, adjusted for timing		<u>(7,935)</u>
i. Expected Actuarial Asset Value as of June 30, 2020, (a) + (b) + (c) + (d) + (e) + (f) + (g) + (h)	\$	43,823,957
5. Actuarial Asset Value, June 30, 2020		<u>43,020,393</u>
6. Actuarial Asset Gain/(Loss), (5) – (4)(i)	\$	(803,564)
7. Actuarial Gain/(Loss), (3) + (6)	\$	(231,776)²

¹ Includes a liability reduction of \$522,826 due to programming enhancements for determining lump sum actuarial equivalence. The FY20 liability experience gain excluding the \$522,826 programming effect is \$48,962.

² The FY20 actuarial loss excluding the \$522,826 programming effect is \$754,602.

Section 1.4: Development of Change in Unfunded Liability during FY20

1. June 30, 2019 Unfunded Liability	\$ (19,346,322)
a. Normal Cost	483,551
b. Interest on (1) and (1)(a)	(1,320,394)
c. Employer Contributions	(860,686)
d. Interest on (c)	(29,615)
e. Administrative Expenses	230,609
f. Interest on (e)	7,935
g. Change in Actuarial Assumptions	<u>0</u>
h. Expected Change in Unfunded Liability during FY20	\$ (1,488,600)
2. Expected June 30, 2020 Unfunded Liability, (1) + (1)(h)	\$ (20,834,922)
a. Liability gain/(loss)	571,788 ¹
b. Asset gain/(loss)	<u>(803,564)</u>
c. Actuarial gain/(loss) during FY20, (2)(a) + (2)(b)	\$ (231,776) ²
3. Actual June 30, 2020 Unfunded Liability, (2) - (2)(c)	\$ (20,603,146)

¹ \$48,962 liability gain excluding the \$522,826 programming effect.

² \$754,602 actuarial loss excluding the \$522,826 programming effect.

Section 1.5: History of Unfunded Liability and Funded Ratio

Valuation Date	Actuarial Accrued Liability	Valuation Assets	Assets as a Percent of Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability (UAAL)
June 30, 2000	\$ 17,967,471	\$ 13,734,397	76.4%	\$ 4,233,074
June 30, 2002	\$ 20,545,214	\$ 12,114,025	59.0%	\$ 8,431,189
June 30, 2004	\$ 19,749,305	\$ 13,391,055	67.8%	\$ 6,358,250
June 30, 2006	\$ 25,457,589	\$ 15,587,569	61.2%	\$ 9,870,020
June 30, 2007	\$ 26,289,978	\$ 16,882,529	64.2%	\$ 9,407,449
June 30, 2008	\$ 28,904,645	\$ 28,370,756	98.2%	\$ 533,889
June 30, 2009	\$ 30,208,411	\$ 30,123,348	99.7%	\$ 85,063
June 30, 2010	\$ 30,034,407	\$ 32,000,585	106.5%	\$ (1,966,178)
June 30, 2011	\$ 31,324,457	\$ 33,019,577	105.4%	\$ (1,695,120)
June 30, 2012	\$ 32,771,017	\$ 33,682,091	102.8%	\$ (911,074)
June 30, 2013	\$ 33,907,968	\$ 34,178,622	100.8%	\$ (270,654)
June 30, 2014	\$ 36,715,287	\$ 36,271,836	98.8%	\$ 443,451
June 30, 2015	\$ 38,313,473	\$ 37,855,133	98.8%	\$ 458,340
June 30, 2016	\$ 31,184,361	\$ 38,439,835	123.3%	\$ (7,255,474)
June 30, 2017	\$ 32,483,912	\$ 39,638,736	122.0%	\$ (7,154,824)
June 30, 2018 ¹	\$ 21,934,014	\$ 41,031,353	187.1%	\$ (19,097,339)
June 30, 2019	\$ 22,592,882	\$ 41,939,204	185.6%	\$ (19,346,322)
June 30, 2020	\$ 22,417,247	\$ 43,020,393	191.9%	\$ (20,603,146)

¹ Approximately \$10.7 million of the decrease in Actuarial Accrued Liability reflected in the June 30, 2018 valuation was due to the elimination of 798 active and vested terminated participants who had cashed out prior to June 30, 2016.

Section 2: Plan Assets

Section 2.1 Summary of Fair Value of Assets

Fair Value of Assets as of June 30	2019	2020
Assets		
1. Cash and Cash Equivalents	\$ 349,952	\$ 73,584
2. Receivables	2,001	309
3. Domestic Equity Pool	11,113,397	11,986,239
4. International Equity Pool	6,171,370	7,671,073
5. Tactical Fixed Income Pool	188,888	0
6. Domestic Fixed Income Pool	18,110,335	17,711,943
7. Emerging Market Equity Pool	1,214,537	1,604,112
8. Taxable Municipal Bonds	1,143,669	0
9. Tactical Allocation Strategies Pool	676,858	1,999,801
10. Alternative Equity	2,089,894	416,501
11. Alternative Beta	<u>0</u>	<u>729,363</u>
12. Total Assets	\$ 41,060,901	\$ 42,192,925
Liabilities		
13. Accrued expenses	\$ 18,765	\$ 22,473
14. Due to State of Alaska General Fund	12,442	12,097
15. Securities Lending Collateral Payable	<u>64,697</u>	<u>62,647</u>
16. Total Liabilities	\$ 95,904	\$ 97,217
Fair Value of Assets, (13) – (16)	\$ 40,964,997	\$ 42,095,708

Section 2.2: Changes in Fair Value of Assets

Fair Value of Assets as of June 30	2019	2020
1. Fair Value of Assets at beginning of year	39,418,117	40,964,997
2. Additions		
a. Employer Contributions	\$ 851,686	\$ 860,686
b. Investment Income	2,387,714	2,199,040
c. Other	0	0
d. Total Additions	\$ 3,239,400	\$ 3,059,726
3. Disbursements		
a. Retirement Benefits	\$ 1,343,753	\$ 1,641,475
b. Administrative Expenses	282,338	230,609
c. Investment Expenses	66,429	56,931
d. Total Deductions	\$ 1,692,520	\$ 1,929,015
4. Fair Value of Assets at end of year, (1) + (2)(d) - (3)(d)	\$ 40,964,997	\$ 42,095,708
Approximate Fair Value Investment Return Rate Net of Investment Expenses	5.9%	5.3%

Section 2.3: Development of Actuarial Value of Assets

The actuarial value of assets was equal to the market value at June 30, 2006. Future investment gains and losses will be recognized 20% per year over 5 years. In no event may valuation assets be less than 80% or more than 120% of market value as of the valuation date.

1. Investment Gain/(Loss) for FY20		
a. Market Value, June 30, 2019	\$	40,964,997
b. Contributions for FY20		860,686
c. Benefit Payments for FY20		1,641,475
d. Administrative Expenses for FY20		230,609
e. Actual Investment Return (net of investment expenses)		2,142,109
f. Expected Return Rate (net of investment expenses)		7.00%
g. Expected Return - Weighted for Timing		2,827,956
h. Investment Gain/(Loss) for the Year, (e) – (g)		(685,847)
2. Actuarial Value, June 30, 2020		
a. Market Value, June 30, 2020	\$	42,095,708
b. Deferred Investment Gain/(Loss)		<u>(924,685)</u>
c. Preliminary Actuarial Value, June 30, 2020, (a) – (b)	\$	43,020,393
d. Upper Limit: 120% of Market Value, June 30, 2020	\$	50,514,850
e. Lower Limit: 80% of Market Value, June 30, 2020	\$	33,676,566
f. Actuarial Value, June 30, 2020, [(c) limited by (d) and (e)]	\$	43,020,393
g. Ratio of Actuarial Value of Assets to Market Value of Assets		102.2%
h. Approximate Actuarial Value Investment Return Rate During FY20 (net of investment expenses)		5.1%

The table below shows the development of gains/(losses) to be recognized in the current year:

Fiscal Year Ending	Asset Gain/(Loss)	Gain/(Loss) Recognized in Prior Years	Gain/(Loss) Recognized This Year	Gain/(Loss) Deferred to Future Years
June 30, 2016	\$ (2,606,836)	\$ (2,085,468)	\$ (521,368)	\$ 0
June 30, 2017	704,309	422,586	140,862	140,861
June 30, 2018	(681,054)	(272,422)	(136,211)	(272,421)
June 30, 2019	(407,413)	(81,483)	(81,483)	(244,447)
June 30, 2020	<u>(685,847)</u>	<u>0</u>	<u>(137,169)</u>	<u>(548,678)</u>
Total	\$ (3,676,841)	\$ (2,016,787)	\$ (735,369)	\$ (924,685)

Section 2.4: Historical Asset Rates of Return

Year Ending	Actuarial Value		Fair Value	
	Annual	Cumulative*	Annual	Cumulative*
June 30, 2005	N/A	N/A	6.4%	6.4%
June 30, 2006	N/A	N/A	5.2%	5.8%
June 30, 2007	8.4%	8.4%	13.1%	8.2%
June 30, 2008	6.4%	7.4%	(2.3)%	5.5%
June 30, 2009	2.8%	5.8%	(9.8)%	2.2%
June 30, 2010	3.0%	5.1%	11.8%	3.8%
June 30, 2011	4.6%	5.0%	13.4%	5.1%
June 30, 2012	3.4%	4.7%	0.5%	4.5%
June 30, 2013	4.6%	4.7%	7.6%	4.8%
June 30, 2014	8.8%	5.2%	13.4%	5.7%
June 30, 2015	7.0%	5.4%	0.9%	5.2%
June 30, 2016	4.2 %	5.3%	(0.2)%	4.8%
June 30, 2017	4.8 %	5.3%	8.2%	5.0%
June 30, 2018	5.3 %	5.3%	4.6%	5.0%
June 30, 2019	4.1 %	5.2%	5.9%	5.1%
June 30, 2020	5.1 %	5.2%	5.3%	5.1%

*Cumulative since FYE June 30, 2005.

Section 3: Member Data

Section 3.1: Summary of Members Included

Census Information as of June 30	2018	2020
Active Air Guard Members		
1. Number	2,139	2,242
2. Number Vested	364	405
3. Average Age	34.98	35.20
4. Average Alaska Guard Service	7.24	7.26
5. Average Total Military Service	12.68	12.82
Active Army Guard Members		
1. Number	1,575	1,639
2. Number Vested	193	218
3. Average Age	32.45	32.85
4. Average Alaska Guard Service	6.00	6.41
5. Average Total Military Service	10.34	10.82
Active Naval Militia Members		
1. Number	63	53
2. Number Vested	8	6
3. Average Age	34.48	33.85
4. Average Alaska Guard Service	5.44	4.34
5. Average Total Military Service	11.86	10.28
Total Active Members		
1. Number	3,777	3,934
2. Number Vested	565	629
3. Average Age	33.92	34.20
4. Average Alaska Guard Service	6.69	6.87
5. Average Total Military Service	11.69	11.95
Vested Terminated Members		
1. Number	588	649
2. Average Age	56.10	57.00
3. Average Alaska Guard Service	13.84	13.84
4. Average Total Military Service	24.42	24.58
Retirees (including QDROs)		
1. Number	752	708
2. Average Age	59.18	58.83
3. Average Years Remaining	11.53	12.13

Section 3.2(a): Age and Service Distributions of Active Members – All Actives

Total Alaska Guard Service										
Age Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
0-19	121	0	0	0	0	0	0	0	0	121
20-24	491	77	0	0	0	0	0	0	0	568
25-29	456	272	48	0	0	0	0	0	0	776
30-34	351	209	157	14	0	0	0	0	0	731
35-39	261	211	156	92	6	0	0	0	0	726
40-44	108	118	138	83	27	4	0	0	0	478
45-49	54	57	66	56	36	21	2	0	0	292
50-54	20	27	31	27	28	21	6	2	0	162
55-59	9	9	12	9	13	10	8	2	0	72
60-64	0	0	2	3	2	0	0	1	0	8
65-69	0	0	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0	0	0
75+	0	0	0	0	0	0	0	0	0	0
Total	1,871	980	610	284	112	56	16	5	0	3,934

Section 3.2(b): Age and Service Distributions of Active Members – Air Actives

Total Alaska Guard Service										
Age Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
0-19	42	0	0	0	0	0	0	0	0	42
20-24	216	25	0	0	0	0	0	0	0	241
25-29	266	151	26	0	0	0	0	0	0	443
30-34	192	121	88	8	0	0	0	0	0	409
35-39	162	131	112	63	5	0	0	0	0	473
40-44	75	73	95	51	20	2	0	0	0	316
45-49	28	30	37	35	23	17	1	0	0	171
50-54	15	9	21	12	15	16	4	2	0	94
55-59	7	7	5	6	8	8	6	2	0	49
60-64	0	0	0	2	1	0	0	1	0	4
65-69	0	0	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0	0	0
75+	0	0	0	0	0	0	0	0	0	0
Total	1,003	547	384	177	72	43	11	5	0	2,242

Section 3.2(c): Age and Service Distributions of Active Members – Army Actives

Total Alaska Guard Service										
Age Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
0-19	79	0	0	0	0	0	0	0	0	79
20-24	264	51	0	0	0	0	0	0	0	315
25-29	184	120	22	0	0	0	0	0	0	326
30-34	148	86	67	6	0	0	0	0	0	307
35-39	97	80	44	29	1	0	0	0	0	251
40-44	31	39	42	31	7	2	0	0	0	152
45-49	25	26	27	21	13	4	1	0	0	117
50-54	4	18	10	14	12	5	2	0	0	65
55-59	2	2	7	3	5	2	2	0	0	23
60-64	0	0	2	1	1	0	0	0	0	4
65-69	0	0	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0	0	0
75+	0	0	0	0	0	0	0	0	0	0
Total	834	422	221	105	39	13	5	0	0	1,639

Section 3.2(d): Age and Service Distributions of Active Members – Navy Actives

Total Alaska Guard Service										
Age Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
0-19	0	0	0	0	0	0	0	0	0	0
20-24	11	1	0	0	0	0	0	0	0	12
25-29	6	1	0	0	0	0	0	0	0	7
30-34	11	2	2	0	0	0	0	0	0	15
35-39	2	0	0	0	0	0	0	0	0	2
40-44	2	6	1	1	0	0	0	0	0	10
45-49	1	1	2	0	0	0	0	0	0	4
50-54	1	0	0	1	1	0	0	0	0	3
55-59	0	0	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0	0	0
75+	0	0	0	0	0	0	0	0	0	0
Total	34	11	5	2	1	0	0	0	0	53

Section 3.3: Member Data Reconciliation

	Active Members	Vested Members	Benefit Recipients	Total
Total at June 30, 2018	3,777	588	752	5,117
New Entrants	902	0	0	902
Rehires	30	0	0	30
Non-vested Terminations	(549)	0	0	(549)
Vested Terminations	(108)	108	0	0
Retirements	(49)	(27)	76	0
New Survivors	0	0	0	0
New QDROs	0	0	1	1
Deaths	0	0	(8)	(8)
Data Changes/Expiration of Benefits	(69) ¹	(20) ²	(113) ³	(202)
Total at June 30, 2020	3,934	649	708	5,291

¹ Includes 69 participants who cashed out on or after June 30, 2018.

² Includes 22 participants who cashed out on or after June 30, 2018 and 2 participants who were rehired from terminated non-vested status and then terminated as vested between June 30, 2018 and June 30, 2020.

³ Includes 122 participants with an expiration of benefits, 5 additions (data corrections), and 4 participants who were rehired from terminated non-vested status and then retired between June 30, 2018 and June 30, 2020.

Section 4: Basis of the Actuarial Valuation

Section 4.1: Summary of Plan Provisions

Effective Date

January 1, 1973

Members Included

Members of the Alaska National Guard who were active on or after January 1, 1973, and members of the Alaska Naval Militia who were active on or after July 1, 1980.

Eligibility Service

Eligibility service is defined as the combined Alaska guard service, guard service in any other state, active military service and the reserves of them. A member must have 20 years of eligibility service to be vested in the National Guard and Naval Militia Retirement System.

Benefit Service

Benefit service is defined as satisfactory service in any branch of the Alaska guard. A member must have 5 years of benefit service to be vested in the National Guard and Naval Militia Retirement System. Benefit service is also used to determine the length of the member's pension retirement benefit.

Retirement

Eligibility

Members are eligible for voluntary retirement after completing 20 years of satisfactory service in the Alaska National Guard, Alaska Naval Militia or U.S. Armed Forces, and the reserve of them or any combination of that service if they have at least five years of Alaska National Guard or Naval Militia service. Credit is also allowed for Territorial Guard service rendered to the former territory of Alaska.

Members are eligible for involuntary retirement at any time assuming there has been no misconduct.

Benefit

Eligible members may elect to receive:

- a. monthly benefits of \$100 which are payable for a period equal to the number of months that they were active members;
- b. a lump sum benefit equal to the actuarial equivalent of a.; or
- c. monthly payments until age 72 equal to the actuarial equivalent of a.

Vesting

Members are 100% vested after 20 years of total service in the Alaska National Guard, Alaska Naval Militia, U.S. Armed Forces or Reserves, or any combination of that service if members have at least five years of Alaska National Guard or Naval Militia service.

Survivor's Benefits

- a. Active Members: If the member has at least five years of active service in the Alaska National Guard or Naval Militia, the designated beneficiary will receive a lump sum benefit equal to the retirement benefit.
- b. Retired or Terminated Vested Members: The designated beneficiary will receive a lump benefit equal to the remaining benefits payable.

Disability Benefits

Members are eligible to receive monthly disability benefits of \$100 (which are payable for a period equal to the number of months that they were active members) at any age if they become incapacitated and are vested in the plan.

Changes Since the Prior Valuation

There have been no changes in benefit provisions since the prior valuation.

Section 4.2: Description of Actuarial Methods and Valuation Procedures

Actuarial Method

Liabilities and contributions shown in the report are computed using the Entry Age Normal Actuarial Cost Method (level dollar basis). Any funding surplus or unfunded accrued liability is amortized over 20 years less the average total military service of active members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that would have been accumulated had annual contributions equal to the normal cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date).

The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of system assets measured on the valuation date.

Under this method, differences between the actual experience and that assumed in the determination of costs and liabilities will emerge as adjustments in the unfunded actuarial accrued liability, subject to amortization.

Valuation of Assets

Effective June 30, 2006, the asset valuation method recognizes 20% of the investment gain or loss in each of the current and preceding four years. This method was phased in over five years. Assets are initialized at market value as of June 30, 2006. All assets are valued at fair market value. Assets are accounted for on an accrued basis and are taken directly from financial statements audited by KPMG LLP. Valuation assets are constrained to a range of 80% to 120% of the market value of assets.

Changes in Methods Since the Prior Valuation

There have been no changes in methods since the prior valuation.

Section 4.3: Summary of Actuarial Assumptions

Investment Return

7.00% per year, net of investment expenses.

Mortality (Pre-Commencement)

RP-2014 employee table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Mortality (Post-Commencement)

91% of male and 96% of female rates of RP-2014 healthy annuitant table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Disability Mortality

RP-2014 disabled table, benefit-weighted, rolled back to 2006, and projected with MP-2017 generational improvement.

Administrative Expenses

The expense load is equal to the average of the prior 2 years' actual administrative expenses rounded to the nearest \$1,000 as follows:

Fiscal Year Ending June 30	Amount
2019	\$ 282,338
2020	230,609
Total	\$ 512,947
	÷ 2
Expense Load (Rounded)	\$ 256,000

Turnover

Ultimate rates of turnover based upon the 2013-2017 actual experience. Sample rates are shown below.

Year of Employment	Select Rates of Turnover During the First 5 Years of Employment		Ultimate Rates of Turnover After the First 5 Years of Employment	
	Unisex Rate	Age	Male Rate	Female Rate
1	20.00%	30	11.09%	14.05%
2	10.00%	40	9.09%	11.52%
3	10.00%	50	4.89%	6.19%
4	10.00%			
5	10.00%			

Disability

Incidence rates based upon the 2013-2017 actual experience of the State of Alaska Public Employees' Retirement System for the Peace Officer/Firefighter group.

Sample rates are shown below.

Age	Male Rate	Female Rate
20	0.0179%	0.0112%
25	0.0374%	0.0234%
30	0.0570%	0.0356%
35	0.0679%	0.0425%
40	0.0822%	0.0514%
45	0.1157%	0.0723%
50	0.1714%	0.1071%
55	0.2954%	0.1846%
60	0.5110%	0.3194%

Retirement

Retirement rates based upon the 2013-2017 actual experience.

Active members are assumed to retire beginning at the earliest eligible retirement age according to the following rates:

Age	Rate	Age	Rate
<51	13%	58	45%
51	13%	59	50%
52	13%	60	55%
53	15%	61	60%
54	20%	62	60%
55	25%	63	60%
56	35%	64	60%
57	40%	65+	100%

Vested Terminated members are assumed to retire at the later of current age or age 50 when electing an annuity, and at current age when electing a lump sum.

Form of Payment

70% of members are assumed to elect a lump sum benefit. 30% of members are assumed to elect a monthly annuity with the number of payments equal to the number of months they were active in the plan. A lump sum of the remaining payments is paid if the member should die while receiving payments. Lump sums are calculated based on a 7% discount rate annuity certain factor.

Imputed Data

Data changes from the prior valuation which are deemed to have an immaterial impact on liabilities and contributions are assumed to be correct in the current year's client data. Active and terminated members with a date of termination after the last date of hire are assumed to be terminated with status based on their amount of vesting service.

Changes in Assumptions Since the Prior Valuation

The amount included in the Normal Cost for administrative expenses was changed from \$242,000 at June 30, 2018 to \$256,000 at June 30, 2020.

Section 5: Actuarial Standards of Practice No. 51

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plans. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plans. Understanding the risks to the funding of the plans is important.

Actuarial Standard of Practice No. 51 (“ASOP 51”) requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary’s professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plan’s future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the 7.00% expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the actuarially determined contribution in the actuarial valuation
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan’s asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plan when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plan uses an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.4 of this report. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plan when the actual contribution amount and the actuarially determined amount differ.

- If the actual contribution is lower than the actuarially determined contribution, the plan may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plan's asset allocations will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- Historical experience of actual returns is shown in Section 2.4 of this report. The cumulative historical experience illustrates that although market returns have been above and below the assumed rate, the overall return during the time period was well below the 7% assumed and therefore the assumed rate, asset allocation, and future market expectations may need to be re-evaluated. A 1% decrease in the long-term return on investment assumption will increase the actuarial accrued liability by approximately 9%.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plans could increase.
- The mortality assumption for the plan mitigates this risk by assuming future improvements in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumption would lead to increased costs for the plan.

Other Demographic Risk

The plan is subject to risks associated with other demographic assumptions (e.g., retirement and termination assumptions). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plan. The demographic assumptions used in the valuation are re-evaluated regularly as part of the 4-year experience studies to ensure the assumptions are consistent with long-term expectations.

Historical Information

Monitoring certain information over time may help understand risks faced by the plan. Historical information is included throughout this report. Some examples are:

- Section 1.5 shows how the plan's funded status (comparison of actuarial accrued liabilities to actuarial value of assets) has changed over time.
- Section 2.4 shows the volatility of asset returns over time.

Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the plan.

Ratio of Retired Liability to Total Liability	June 30, 2018	June 30, 2020
1. Retiree and Beneficiary Accrued Liability	\$ 6,094,900	\$ 5,808,004
2. Total Accrued Liability	\$ 21,934,014	\$ 22,417,247
3. Ratio, (1) ÷ (2)	27.8%	25.9%

A high percentage of liability concentrated on participants in pay status indicates a mature plan (often a ratio above 60% - 65%). An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption and increased costs. Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions creating an increased reliance on investment returns. This ratio should be monitored each year in the future.

Ratio of Cash Flow to Assets	FYE June 30, 2018	FYE June 30, 2020
1. Contributions	\$ 907,231	\$ 860,686
2. Benefit Payments	<u>1,359,467</u>	<u>1,641,475</u>
3. Cash Flow, (1) - (2)	\$ (452,236)	\$ (780,789)
4. Fair Value of Assets	\$ 39,418,117	\$ 42,095,708
5. Ratio, (3) ÷ (4)	(1.1%)	(1.9%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the trust. Negative cash flow indicates the trust needs to rely on investment returns to cover benefit payments and / or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which can increase the investment risk. Currently, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. This maturity measure should be monitored in the future.

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension benefits and the necessary amount of contributions to fund those benefits.

Actuary

Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.

Annual Required Contribution

Disclosure measure of annual pension cost.

GASB 67 and 68

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013 and defines new financial reporting requirements for public pension plans.

Governmental Accounting Standards Board Statement Number 68 amends Number 27 effective for fiscal years beginning after June 15, 2014 and defines new accounting and financial reporting requirements for employers sponsoring public pension plans

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual member or the plan as a whole.

Unfunded Actuarial Accrued Liability (UAAL)

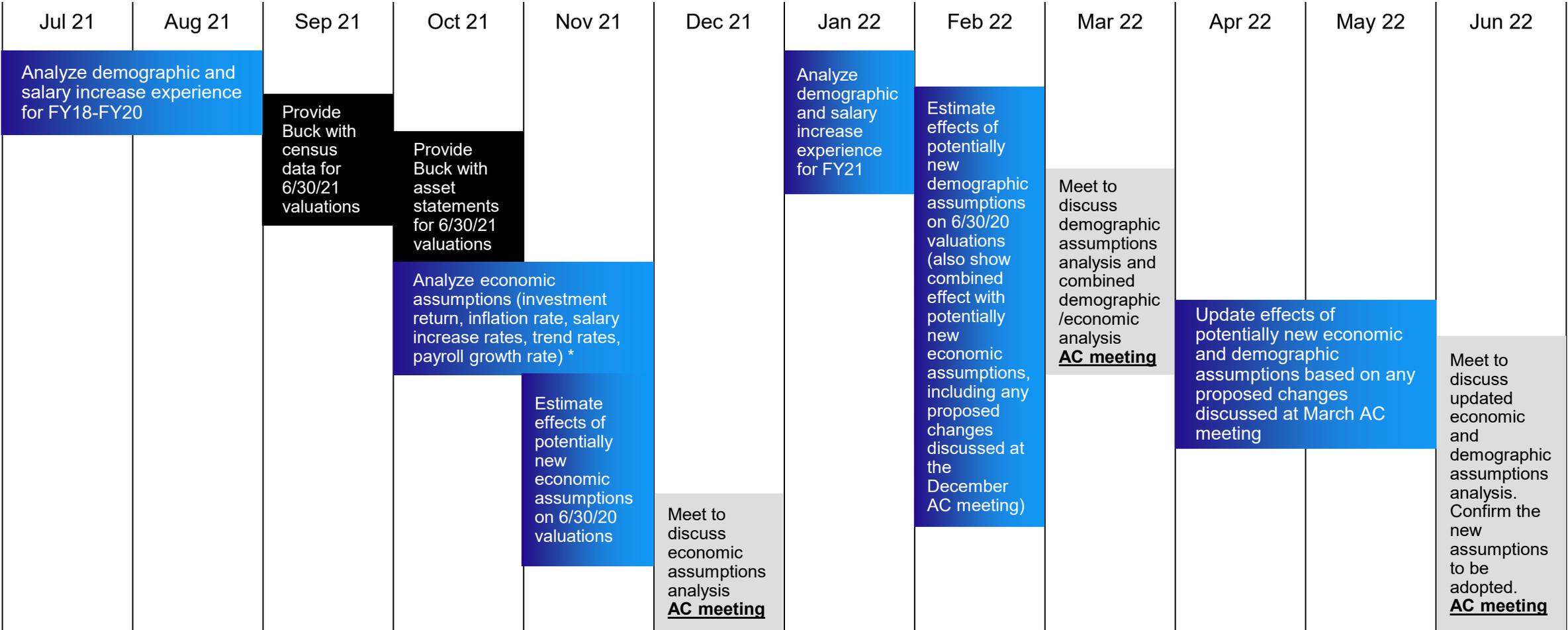
The portion of the actuarial accrued liability not offset by plan assets.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment status.

Experience study preliminary timeline – 7/1/17 to 6/30/21 experience

New assumptions adopted by ARMB to be effective for 6/30/22 valuations



● Buck ● All ● DRB

* Economic analysis will be based on Buck's June 2021 capital market assumptions. Only 3 of 4 years of salary experience will be available at this time.



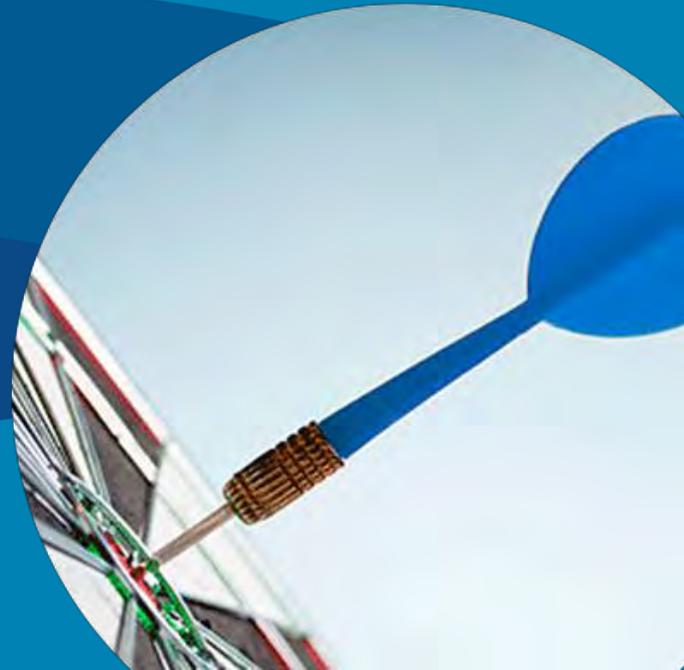
Alaska Retirement Management Board Actuarial Committee

2020 Valuations - Actuarial Review

Paul Wood, ASA, FCA, MAAA

Bill Detweiler, ASA, FCA, MAAA

March 17, 2021



Review of the June 30, 2020 Actuarial Valuation

- Claims and Enrollment Review
- Assumptions Review
- Test Life Review

Claims and Enrollment Review

- Buck provided a PowerPoint that showed the development of the Per Capita Claims Costs (PCCC)
- Overall, based on the data in the PowerPoint, there was favorable claims experience meaning the PCCC did not increase as much as was expected

Claims and Enrollment Review

PCCC Claims Development

- Overall, we found the development of the PCCC to be reasonable
- The table below shows the final PCCC used in the valuation, as confirmed through test life checking
- It also compares the PCCC used this year to those used last year

Per Capita Claims Cost (Age 65)						
	Medical			Prescription Drugs		
	<u>June 30, 2019</u>	<u>June 30, 2020</u>	<u>Change</u>	<u>June 30, 2019</u>	<u>June 30, 2020</u>	<u>Change</u>
	<u>Valuation</u>	<u>Valuation</u>		<u>Valuation</u>	<u>Valuation</u>	
Pre-Medicare	\$ 14,464	\$ 15,360	6.2%	\$ 3,263	\$ 3,393	4.0%
Medicare Parts A & B	\$ 1,534	\$ 1,618	5.5%	\$ 3,501	\$ 3,340	-4.6%
Medicare Part B Only	\$ 4,880	\$ 5,340	9.4%	\$ 3,501	\$ 3,340	-4.6%
Medicare Part D – EGWP	N/A	N/A	N/A	\$ 1,044	\$ 1,003	-3.9%

Claims and Enrollment Review

PCCC Gains and COVID-19 Experience

- Large gains 4 years in a row
 - 2020 gains explained again by new Optum contract and rebates in 2019
- Claims significantly decreased at beginning of global pandemic
 - Buck made a reasonable adjustment to account for this in PCCC development
- Both of these items need to be carefully monitored going forward to see if claims swing back in the other direction

Assumptions Review

Gains and Losses

- Now have two years of experience under most recently adopted assumptions
- Still too soon to ascertain effectiveness, but can start to monitor any developing trends
 - New Medicare Part B Assumption causing consistent gains
 - Investment return expectations still continuing a downward trend around the country

Assumptions Review

DCR – Relative Value and Trend

- In prior reviews, GRS requested additional information for relative value assumptions and recommended removal of the 0.2% trend assumption
- Buck provided additional information for the relative value assumptions used in the 2020 valuations and we can now certify their reasonableness
- Buck removed the 0.2% trend assumption

Test Life Review

- For a sample group we examine the following:
 - Data inputs
 - Benefit amounts
 - Liability calculations
- The sample lives tell us if the assumptions are correctly employed
- They tell us if the plan provisions are valued correctly

Test Life Review - Findings

- Materiality Standards
 - Actuaries look to the Actuarial Standards of Practice
 - “An item or a combination of related items is material if its omission or misstatement could influence a decision of an intended user”
 - Relies heavily on the professional judgement of the actuary

Test Life Review - Findings

- We choose test lives each year that are different and contain unique characteristics
- In years with no assumption or plan changes, we first replicate the significant benefits (retirement/withdrawal), then dive deeper into small differences on the ancillary benefits (death/disability)
- As a result, we were able to identify some minor findings this year related to the valuation of certain ancillary benefits

Test Life Review - Findings

- **Finding #1** - Timing of Alaska COLA for Disability
 - 10% Alaska COLA should be applied to all disabled members immediately
 - One of the test lives this year was a TRS member who retired from disability and is not having the COLA applied until age 65
 - We recommend this COLA be applied immediately to all disabled members in both TRS and PERS.
- **Finding #2** - Retirement Benefit for PERS DB Peace Officer/Firefighter Occupational Disability
 - When PERS Peace Officer/Firefighter members retire from occupational disability in both DCR and DB plans, their benefit should be increased by the same accumulative PRPA percentage that was applied to the disability benefit, but this is currently only being applied to Peach Officer/Firefighter members in the DCR plan
 - We recommend this increase also be applied to Peace Officer/Firefighters in the PERS DB plan

Test Life Review - Findings

- **Finding #3** - Rate Used in Valuation Not Matching Rate Disclosed in Report
 - We found a withdrawal decrement rate that was slightly inconsistent between the report and the test life
 - Since GRS only receives a select number of lives to review each year, we cannot verify that every single decrement rate disclosed in the reports matches those being used in the valuations
 - We recommend Buck verify that all of the rates in their reports match the rates being used in the valuations
- **Finding #4** - Actuarial Assumptions for TRS and JRS Early Retirement Factors
 - Early retirement factors for both the TRS and JRS DB plans are based on actuarial equivalence, but it is not clear from the valuation reports what assumptions are being used
 - We recommend the assumptions used for actuarial equivalent early retirement factors be disclosed in the reports

Test Life Review - Findings

- **Finding #5** – Death benefits for NGNMRS current retirees
 - We found that the death benefit amount for current retirees is using the standard \$1,200 annual benefit for everyone, even for those that have an annual benefit amount other than \$1,200
 - The death benefit amount should be based on the retirees current benefit amount, which isn't always \$1,200
 - We recommend Buck base the death benefit amount on the retirees current benefit

Test Life Review – Findings

Communications with Buck

- We provided these findings to Buck
 - For **Finding #3**, Buck indicated that they have updated this specific rate in the June 30, 2020 PERS DCR valuation report to match what is being used in their calculations
 - For **Finding #4**, Buck clarified that these are older factors that have been grandfathered, since ERFs based on the more recently adopted actuarially assumptions produce lower benefit amounts

Test Life Review – Findings

Communications with Buck

- For the other three findings, Buck agreed they should be updated and estimated the impact of these changes as follows:
 - Updating for **Finding #1** would increase the June 30, 2020 actuarial accrued liability by approximately \$3.1 million for the PERS DB plan and \$0.3 million for the TRS DB plan.
 - Updating for **Finding #2** would decrease the June 30, 2020 actuarial accrued liability by approximately \$0.1 million for the PERS DB plan.
 - Updating for **Finding #5** would decrease the June 30, 2020 actuarial accrued liability by approximately \$38 thousand for the NGNMRS plan.
- As shown, the impacts may be viewed as immaterial and, at the very least, be updated in future valuations, subject to Actuarial Committee discretion.

Test Life Review – Summary

PERS DB Pension

PERS DB - Active Test Case 1 - P/F Tier 1

<i>Basic Data:</i>	<u>Current Age</u>	<u>Credited Service</u>	<u>Gender</u>
	61.3	22.6	Male
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Total Retirement PVB</i>	666,878	666,877	0.0%
<i>Total Withdrawal PVB</i>	-	-	0.0%
<i>Total Death PVB</i>	13,748	13,781	-0.2%
<i>Total Disability PVB</i>	-	-	0.0%
GRAND TOTAL PVB	680,626	680,659	0.0%

PERS DB - Active Test Case 2 - Others Tier 2

<i>Basic Data:</i>	<u>Current Age</u>	<u>Credited Service</u>	<u>Gender</u>
	50.2	26.6	Male
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Total Retirement PVB</i>	702,544	702,544	0.0%
<i>Total Withdrawal PVB</i>	45,784	45,796	0.0%
<i>Total Death PVB</i>	6,580	6,571	0.1%
<i>Total Disability PVB</i>	3,715	3,715	0.0%
GRAND TOTAL PVB	758,624	758,627	0.0%

PERS DB - Active Test Case 3 - P/F Tier 3

<i>Basic Data:</i>	<u>Current Age</u>	<u>Credited Service</u>	<u>Gender</u>
	38.4	18.0	Male
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Total Retirement PVB</i>	865,420	865,420	0.0%
<i>Total Withdrawal PVB</i>	7,860	7,858	0.0%
<i>Total Death PVB</i>	7,847	7,841	0.1%
<i>Total Disability PVB</i>	1,473	1,464	0.6%
GRAND TOTAL PVB	882,600	882,583	0.0%

PERS DB - Inactive Test Cases

Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>PERS Peace Officer/Firefighter - Retiree</i>	516,671	516,671	0.0%
<i>PERS Peace Officer/Firefighter - Beneficiary</i>	146,222	146,222	0.0%
<i>PERS Peace Officer/Firefighter - DV</i>	129,577	130,119	-0.4%
<i>PERS Others - Retiree</i>	93,209	93,209	0.0%
<i>PERS Others - Beneficiary</i>	61,401	61,401	0.0%
<i>PERS Others - DV</i>	87,991	87,991	0.0%



Test Life Review – Summary

TRS DB Pension

TRS DB - Active Test Case 1 - Tier 1			
<i>Basic Data:</i>	<u>Current Age</u>	<u>Credited Service</u>	<u>Gender</u>
	53.9	29.8	Female
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Total Retirement PVB</i>	793,077	793,076	0.0%
<i>Total Withdrawal PVB</i>	-	-	0.0%
<i>Total Death PVB</i>	4,003	4,004	0.0%
<i>Total Disability PVB</i>	-	-	0.0%
GRAND TOTAL PVB	797,080	797,080	0.0%

TRS DB - Active Test Case 2 - Tier 2			
<i>Basic Data:</i>	<u>Current Age</u>	<u>Credited Service</u>	<u>Gender</u>
	49.3	14.9	Female
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Total Retirement PVB</i>	311,110	311,110	0.0%
<i>Total Withdrawal PVB</i>	38,928	38,940	0.0%
<i>Total Death PVB</i>	2,434	2,433	0.0%
<i>Total Disability PVB</i>	2,273	2,288	-0.7%
GRAND TOTAL PVB	354,744	354,771	0.0%

TRS DB - Active Test Case 3 - Tier 2			
<i>Basic Data:</i>	<u>Current Age</u>	<u>Credited Service</u>	<u>Gender</u>
	40.75	10.0	Female
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Total Retirement PVB</i>	196,812	196,812	0.0%
<i>Total Withdrawal PVB</i>	23,284	23,267	0.1%
<i>Total Death PVB</i>	1,555	1,553	0.2%
<i>Total Disability PVB</i>	2,697	2,696	0.0%
GRAND TOTAL PVB	224,348	224,328	0.0%

TRS DB - Inactive Test Cases			
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>TRS - Retiree - Female, Tier 1</i>	764,636	764,636	0.0%
<i>TRS - DV - Female, Tier 2</i>	216,584	215,024	0.7%
<i>TRS - Disabled Retiree - Male, Tier 2</i>	298,517	310,573	-3.9%



Test Life Review – Summary

PERS Retiree Health

Actives	Test Case 1 - PF Tier 1			Test Case 2 - Other Tier 2			Test Case 3 - P/F Tier 3		
Basic Data:									
Sex	Active			Male			Male		
Current Age	61.26			50.17			38.42		
Current Credited Service	22.58			30.46			18.04		
Present Value of Benefits (PVB)	GRS*	Buck	% Diff	GRS	Buck	% Diff	GRS	Buck	% Diff
Retirement:									
Tier x <Member>	125,239	125,241	0.0%	171,056	171,018	0.0%	179,841	180,716	-0.5%
Tier x <Spouse>	122,991	122,986	0.0%	129,473	128,318	0.9%	150,644	149,632	0.7%
Contrib Tier x <Member>	-	-	0.0%	-	-	0.0%	5,792	5,844	-0.9%
Contrib Tier x <Spouse>	-	-	0.0%	-	-	0.0%	4,378	4,417	-0.9%
Post 65 Part D Tier x <Member>	17,528	17,530	0.0%	12,576	12,574	0.0%	10,182	10,239	-0.6%
Post 65 Part D Tier x <Spouse>	13,329	13,330	0.0%	8,122	8,121	0.0%	7,524	7,579	-0.7%
Total Retirement PVB	217,373	217,367	0.0%	279,830	278,641	0.4%	302,609	302,269	0.1%

Inactives - PVB	GRS	Buck	% Diff
Retiree - P/F Tier 2 - Female	75,774	75,766	0.0%
Beneficiary - P/F Tier 2 - Female	83,401	83,391	0.0%
Vested Termination - P/F Tier 3 - Male	243,669	239,695	1.7%
Retiree - Other Tier 2 - Female	181,915	181,885	0.0%
Beneficiary - Other Tier 1 - Male	82,929	82,917	0.0%
Vested Termination - Other Tier 1 - Male	124,744	124,732	0.0%



Test Life Review – Summary

TRS Retiree Health

Actives	Test Case 1 - Tier 1		
<i>Basic Data:</i>			
Sex	Female		
Current Age	53.88		
Current Credited Service	29.80		
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Retirement:</i>			
Tier x <Member>	192,295	192,258	0.0%
Tier x <Spouse>	99,451	99,386	0.1%
Post 65 Part D Tier x <Member>	(17,351)	(17,348)	0.0%
Post 65 Part D Tier x <Spouse>	(10,163)	(10,162)	0.0%
Contrib <Member>	-	-	0.0%
Contrib <Spouse>	-	-	0.0%
Total Retirement PVB	264,232	264,134	0.0%

Test Case 2 - Tier 2		
Female		
49.32		
14.90		
GRS	Buck	% Diff
120,103	120,080	0.0%
60,112	56,507	6.4%
(12,610)	(12,608)	0.0%
(7,428)	(7,427)	0.0%
(2,049)	(2,085)	-1.8%
(1,225)	(1,247)	-1.8%
156,902	153,220	2.4%

Inactives - PVB	GRS	Buck	% Diff
Retiree - Female	91,040	91,027	0.0%
Vested Termination - Female	253,152	252,880	0.1%
Disabled - Male	96,845	96,872	0.0%



Test Life Review – Summary

DCR PERS and TRS Pension

DCR Active Test Case 1 PERS Other			
<u>Basic Data:</u>	<u>Current Age</u>	<u>Credited Service</u>	<u>Sex</u>
	38.68	1.81	Female
Present Value of Benefits (PVB)	GRS	Buck	% Diff
Total Disability PVB	674.72	674.00	0.1%
Total Death PVB	286.42	286.38	0.0%
GRAND TOTAL PVB	961.14	960.38	0.1%

DCR Active Test Case 3 TRS			
<u>Basic Data:</u>	<u>Current Age</u>	<u>Credited Service</u>	<u>Sex</u>
	46.09	7.00	Female
Present Value of Benefits (PVB)	GRS	Buck	% Diff
Total Disability PVB	370.90	370.97	0.0%
Total Death PVB	202.17	202.20	0.0%
GRAND TOTAL PVB	573.07	573.17	0.0%

DCR Active Test Case 2 PERS P/F			
<u>Basic Data:</u>	<u>Current Age</u>	<u>Credited Service</u>	<u>Sex</u>
	42.49	8.80	Male
Present Value of Benefits (PVB)	GRS	Buck	% Diff
Total Disability PVB	8,612.96	8,612.08	0.0%
Total Death PVB	2,804.89	2,805.46	0.0%
GRAND TOTAL PVB	11,417.85	11,417.54	0.0%

DCR Inactive Test Cases			
Present Value of Benefits (PVB)	GRS	Buck	% Diff
PERS Other - Disability	105,463.31	105,727.00	-0.2%
PERS P/F - Disability	392,894.45	393,524.00	-0.2%
TRS - Disability	197,312.89	196,453.00	0.4%



Test Life Review – Summary

DCR PERS and TRS Retiree Health

Actives	Test Case 1 - PERS Other			Test Case 2 - PERS PF			Test Case 3 - TRS		
<i>Basic Data:</i>									
Sex	Female			Male			Female		
Current Age	38.67			42.49			46.0847		
Current Credited Service	1.30			8.80			7.00		
Present Value of Benefits (PVB)	GRS	Buck	% Diff	GRS	Buck	% Diff	GRS	Buck	% Diff
<i>Retirement:</i>									
Post 65 DCR <Member>	3,540.33	3,553.50	-0.4%	13,475.88	13,535.02	-0.4%	11,193.54	11,216.62	-0.2%
Post 65 DCR <Spouse>	1,928.30	1,935.48	-0.4%	13,643.40	13,714.75	-0.5%	6,026.20	6,038.64	-0.2%
Contrib DCR <Member>	(448.97)	(450.27)	-0.3%	(1,498.95)	(1,515.23)	-1.1%	(1,521.96)	(1,483.92)	2.6%
Contrib DCR <Spouse>	(244.87)	(245.58)	-0.3%	(1,539.51)	(1,558.84)	-1.2%	(820.48)	(800.17)	2.5%
Post 65 Part D DCR <Member>	629.04	614.38	2.4%	2,413.49	2,391.74	0.9%	1,911.07	1,923.05	-0.6%
Post 65 Part D DCR <Spouse>	341.68	333.79	2.4%	1,871.29	1,855.78	0.8%	1,027.52	1,033.93	-0.6%
Total Retirement PVB	5,745.51	5,741.30	0.1%	28,365.59	28,423.22	-0.2%	17,815.89	17,928.15	-0.6%

Inactives - PVB	GRS	Buck	% Diff
PERS Other - Disability	80,578.85	77,687.00	3.7%
PERS P/F - Disability	67,287.96	67,838.00	-0.8%
TRS - Disability	72,972.09	75,144.00	-2.9%



Test Life Review – Summary

JRS Pension

Actives	Test Case 1 - Pension		
<i>Basic Data:</i>			
Sex	Male		
Current Age	53.91		
Current Credited Service	17.28		
Present Value of Benefits (PVB)	GRS*	Buck	% Diff
Normal Retirement Benefit	1,103,126.30	1,103,126.25	0.0%
Early Retirement Benefit	342,591.19	342,591.14	0.0%
Total Retirement PVB	1,445,717.49	1,445,717.39	0.0%
Disability Benefit	1,837.37	1,837.37	0.0%
Disability Benefit < 2	-	-	
Total Disability PVB	1,837.37	1,837.37	0.0%
Married and Eligible	12,807.11	12,808.01	0.0%
Married and Not Eligible	9,896.40	9,895.63	0.0%
Single	571.86	573.79	-0.3%
Death Benefit < 2	-	-	
Total Death PVB	23,275.36	23,277.43	0.0%
Nonvested	-	-	
Normal DV Benefit	18,286.80	18,286.80	0.0%
Normal DV Death Benefit	-	-	
Total Withdrawal PVB	18,286.80	18,286.80	0.0%
GRAND TOTAL PVB	1,489,117.03	1,489,118.99	0.0%

Inactives - PVB	GRS*	Buck	% Diff
Retiree - Pension	1,907,267	1,907,267	0.0%
Deferred Vested	686,193	686,967	-0.1%



Test Life Review – Summary

JRS Retiree Health

	Test Case 1 - Health		
Present Value of Benefits (PVB)	GRS	Buck	% Diff
<i>Retirement:</i>			
Benefit - Member	126,019.10	126,290.32	-0.2%
Benefit - Spouse	146,760.68	148,013.46	-0.8%
Post 65 Part D Contribution - Member	(15,414.26)	(15,468.50)	-0.4%
Post 65 Part D Contribution - Spouse	(13,982.23)	(14,029.28)	-0.3%
Total Retirement PVB	243,383.29	244,806.00	-0.6%
<i>Inactives - PVB</i>			
Retiree - Health	77,409.79	76,679.00	1.0%
Deferred Vested - Health	308,550.14	318,651.00	-3.2%
Total Retirement PVB	2,979,419.91	2,989,563.60	-0.3%

Test Life Review – Summary

NGNMRS Pension

<i>Actives</i>	Test Case 1		
<u>Basic Data:</u>			
Sex	Male		
Current Age	29.38		
Current Credited Service	8.00		
Present Value of Benefits (PVB)	GRS	Buck	% Diff
Normal Retirement Benefit - LS	792.33	800.70	-1.0%
Normal Retirement Benefit - Annuity	330.56	332.31	-0.5%
Normal Retirement Benefit - Annuity - Death	19.51	19.51	0.0%
Total Retirement PVB	1,142.40	1,152.52	-0.9%
Disability Benefit - LS	7.19	7.19	0.0%
Disability Benefit - Annuity	2.62	2.62	0.0%
Disability Benefit - Annuity - Death	0.87	0.87	0.0%
Total Disability PVB	10.68	10.68	0.0%
Death Benefit	57.75	57.92	-0.3%
Total Death PVB	57.75	57.92	-0.3%
Term Benefit	-	-	
Total Withdrawal PVB	-	-	0.0%
GRAND TOTAL PVB	1,210.84	1,221.12	-0.8%

<i>Inactives - PVB</i>	GRS	Buck	% Diff
Retiree	3,621	3,795	-4.6%
Deferred Vested	12,172	12,165	0.1%



Summary of Recommendations

- Buck continue to carefully monitor the newly adopted assumptions going forward to determine if they are working as intended
- Buck continues to track the medical claims experience closely, particularly any further impact of the drug costs associated with the new vendor and any further impact from COVID-19 experience
- Buck review with the Board whether to implement a new entrant/rehire assumption in the DCR plan
- Buck continue to disclose the nature and impact of all programming changes included in the valuation
- Buck generate a new gain/loss item that tracks the experience of the EGWP savings assumption
- Buck detail the risk associated with assuming the EGWP subsidies will continue in perpetuity, especially if EGWP subsidies wear away over time.
- Buck implement the changes to their valuation methods as detailed in Section 6 of the report
- Buck make some small modifications to their valuation reports to improve communication and disclosures

February 26, 2021



ARMB Board Meeting

Preliminary Investment Performance
Periods Ended December 31, 2020

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

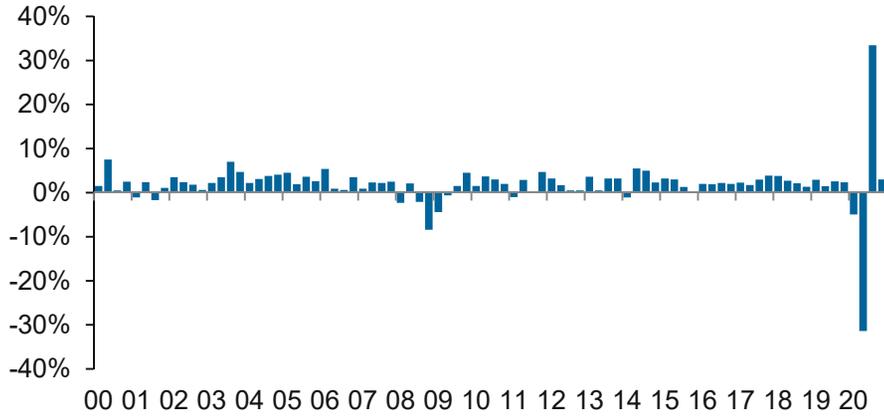
Agenda

- Market and Economic Environment
- Total Fund Performance
 - Defined Benefit Plans' Major Asset Classes
 - Participant-Directed Plans
- DC-Survey Results

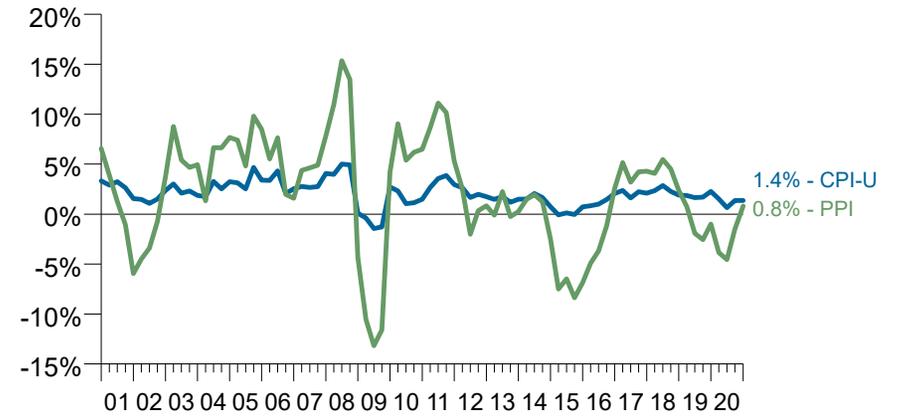
U.S. Economy—Summary

For periods ended 12/31/20

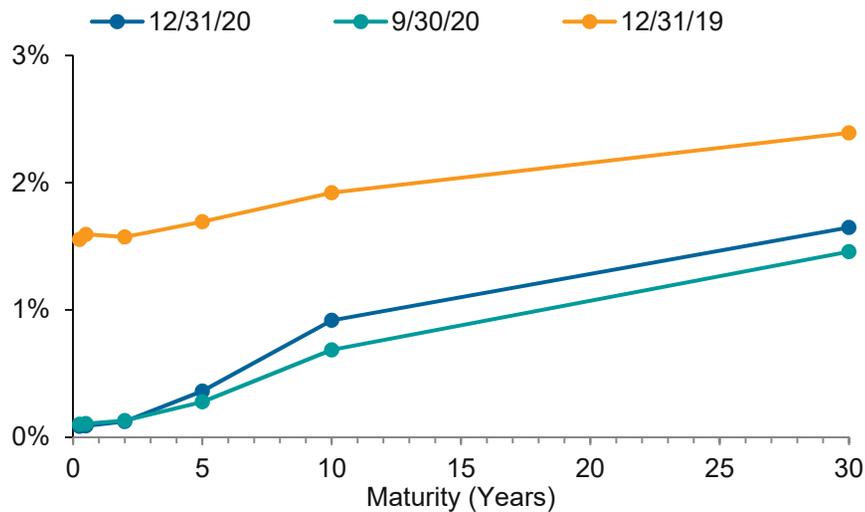
Quarterly Real GDP Growth*



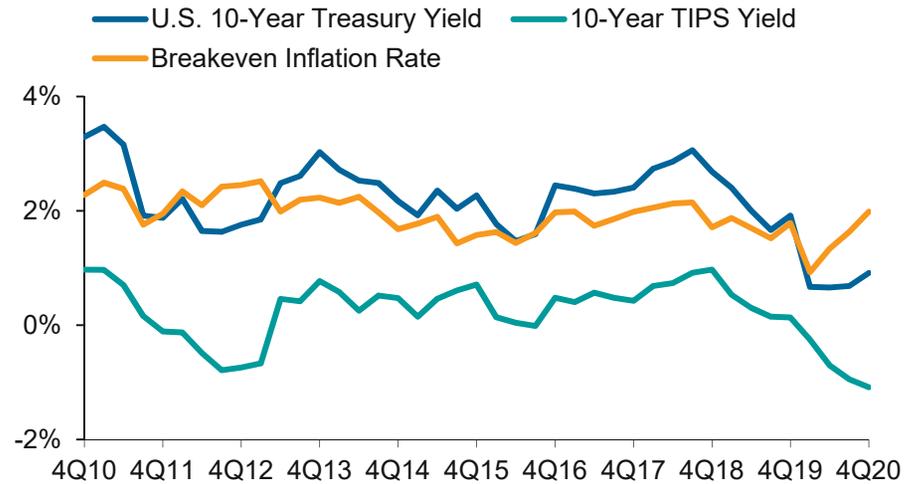
Inflation Year-Over-Year



U.S. Treasury Yield Curves



Historical 10-Year Yields



*Preliminary estimate for 4Q20. Sources: Bloomberg, Bureau of Labor Statistics, Callan, IHS Markit

Market Environment: 4Q20

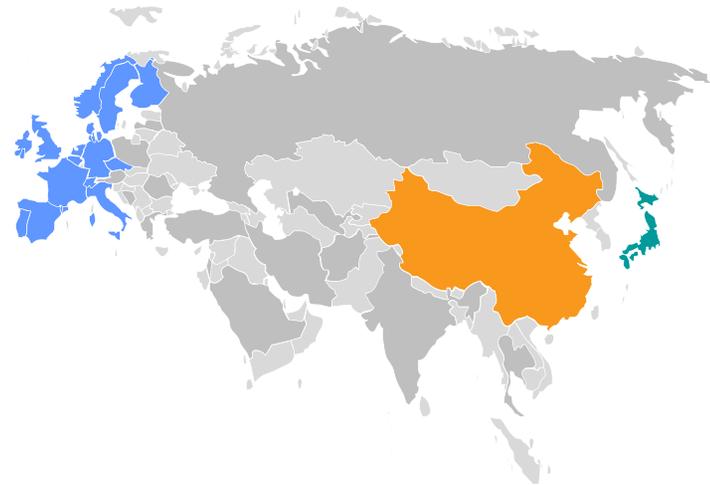
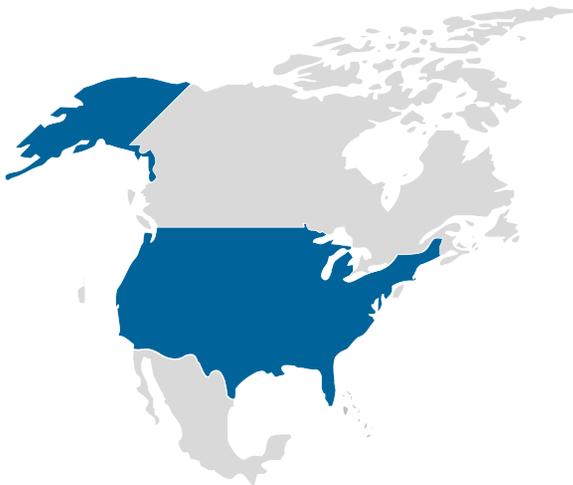
High degree of uncertainty

U.S.

- 2Q GDP -31.4%, largest decline on record; 3Q gain of 33%, solid growth of 3% estimated for 4Q
- Retail sales, durable goods, and personal spending rebounded in 2Q and 3Q, but growth slowed in August and September as stimulus waned.
- Unemployment dropped to 6.7% in November from 14.7% April peak.
 - Jobless claims decelerated to less than 1 million per week but are still elevated relative to prior recession peaks.
- Housing benefiting from relatively low mortgage rates
- Fed left rates close to 0% and expects to be on hold until at least 2023.

Global

- Euro zone 1Q GDP contracted 3.7% (-14% annualized), followed by 11.7% drop (-39.2% annualized) in 2Q, largest Q drop on record; 12.5% jump (60% annualized!) in 3Q
- U.K. GDP sank 18.8% in 2Q (-57% annualized)—most ever, rebounded 16% (81% annualized) in 3Q
- Japan's economy shrank 8.3% (-29% annualized) in 2Q; third straight quarterly drop, dating back to 2019; 5.3% growth (22.9% annualized) in 3Q
- China's GDP fell 10% (-34% annualized) in 1Q, but rebounded 11.7% (56% annualized) in 2Q and is up 2.7% (11.3% annualized) in 3Q; only country expected to grow in 2020

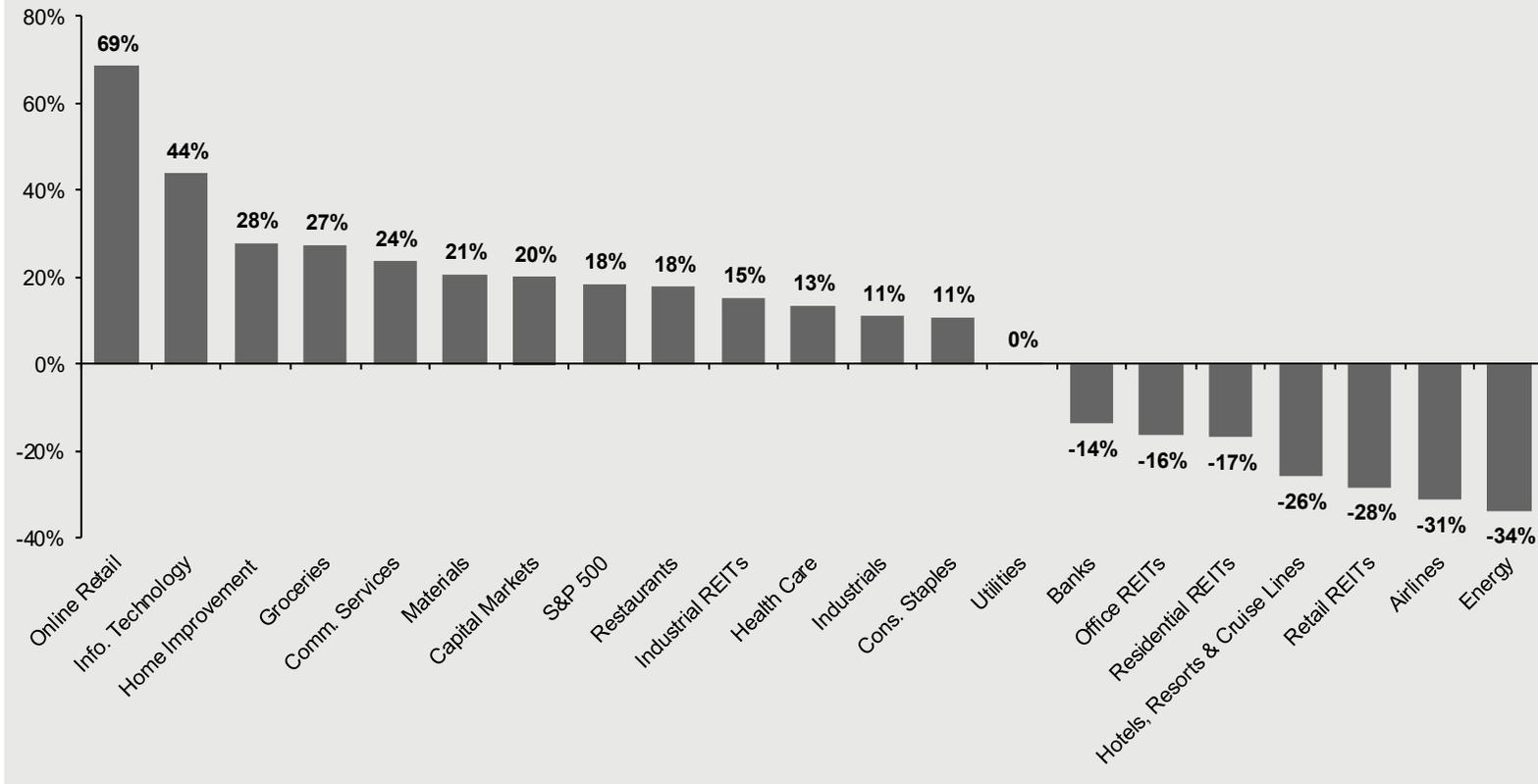


U.S. Stock Market Returns in 2020 Were Widely Dispersed

Concentration of outperformance in technology, online retail, and supporting industries

Returns since December 31, 2019

Total returns by sector and industry

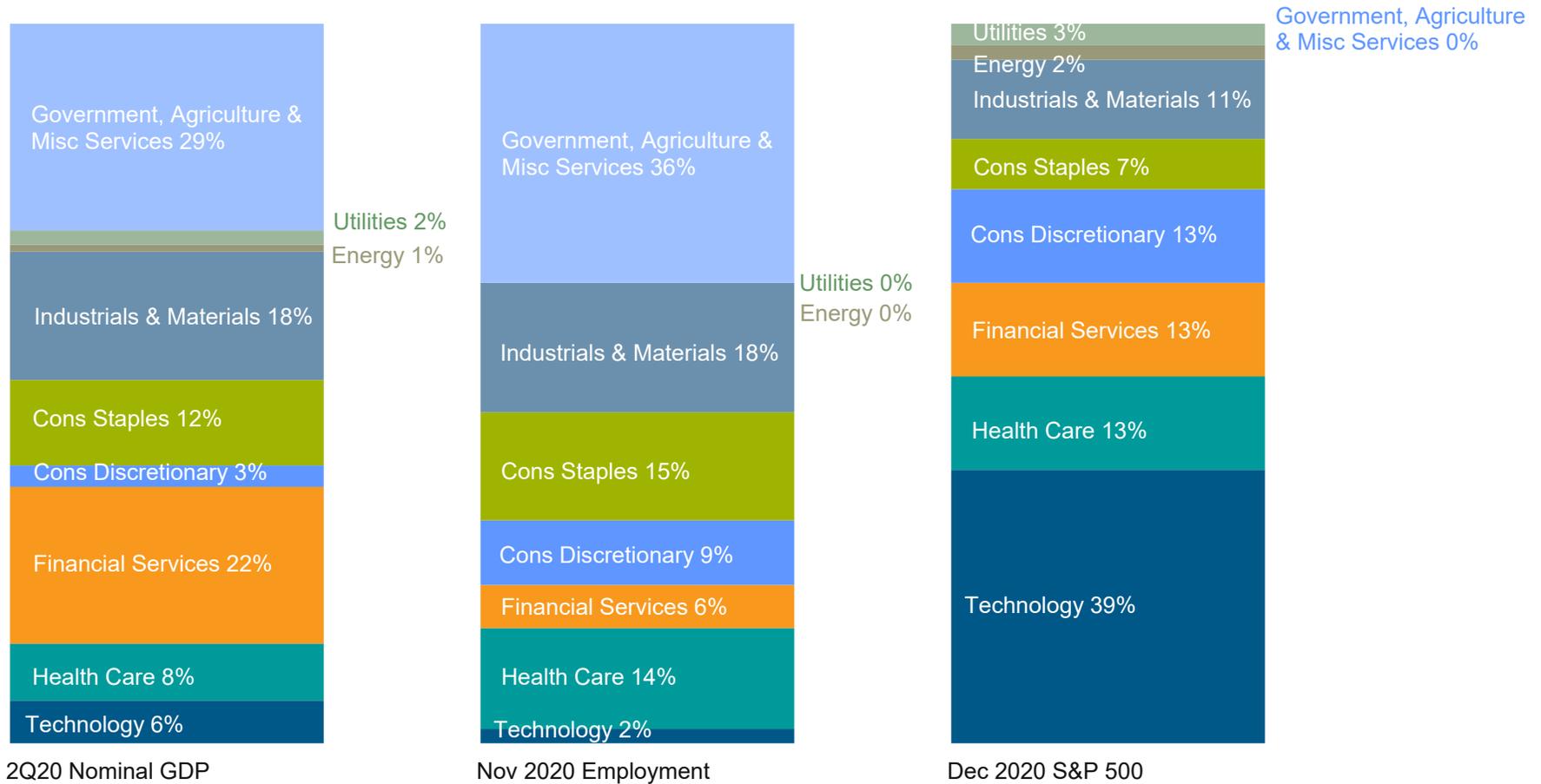


Best-performing sectors employ far fewer workers than many of the underperforming sectors (health care, capital markets, banks, hospitality, transportation, energy).

Sources: FactSet, J.P. Morgan Asset Management Guide to the Markets – U.S., S&P Dow Jones Indices; Data are as of 12/31/20.

The Stock Market Is Not the Economy

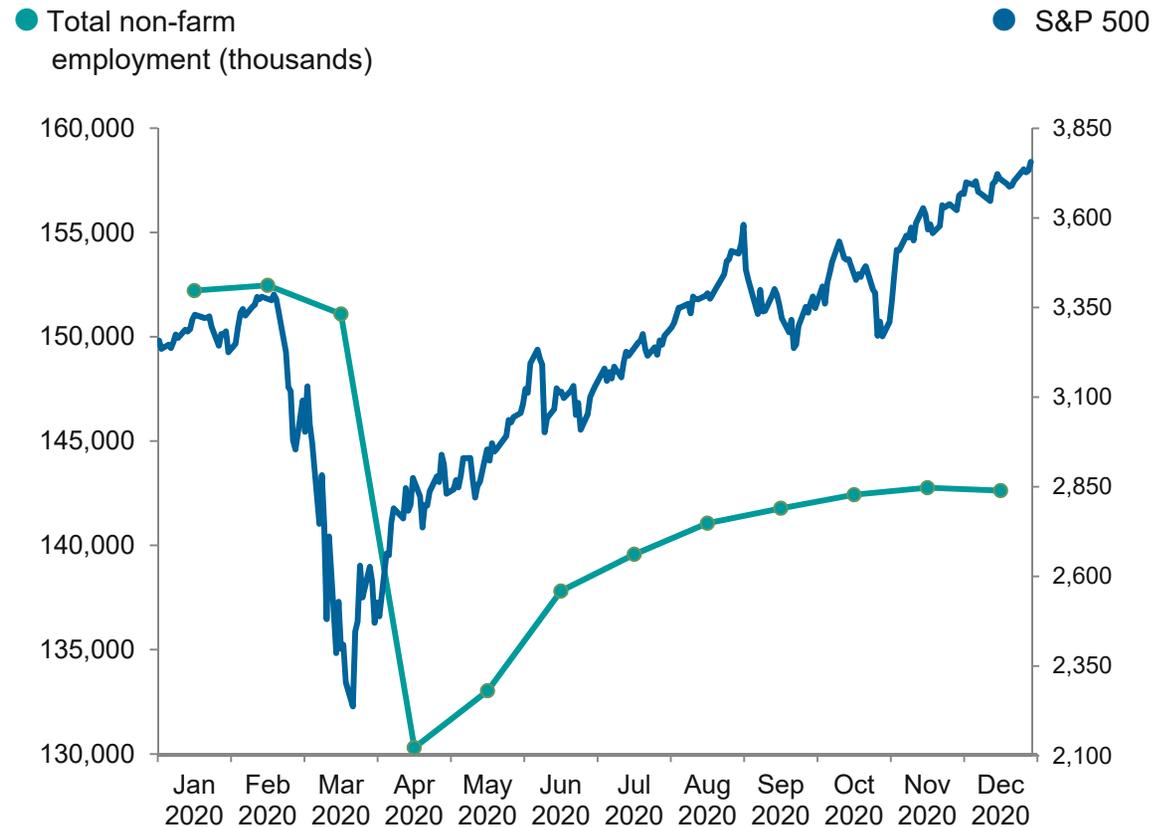
Sector share of GDP, employment, and S&P 500



Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, S&P Dow Jones Indices, J.P. Morgan Asset Management Guide to the Markets – U.S. Data are as of 12/31/20. Technology: information (economy, employment), technology and communication services (S&P 500). Financial services includes real estate (S&P 500). Consumer discretionary: Arts, entertainment, recreation, accommodation, and food services (economy), leisure and hospitality (employment). Consumer staples: wholesale trade and retail trade (economy, employment). Industrials and materials: construction, manufacturing, transportation and warehousing (economy, employment). Energy: mining (economy), mining and logging (employment). Government, agriculture & misc. services: government, other services, professional and business services, education and agriculture, forestry, fishing, and hunting (economy), government, other services, professional and business services, and education (employment).

The Stock Market Is Not the Economy

- U.S. equity market has already recovered from the March 2020 plunge and was up 18.4% through December 2020.
- The job market lost over 22 million jobs in March and April, and has recovered just over half (12 million) since May.
- GDP is projected to remain below the February 2020 pre-COVID peak until mid-to late 2021.
- Steep structural challenges face many job-laden sectors of the economy that are underrepresented in the current stock market valuation.
- Stimulus benefit to unemployed and to employers carried through 3Q; extension of benefits at year-end 2020 helped, but growth slowed in 4Q20 and the recovery faces a serious slowdown in 1Q21 and perhaps into 2Q.
- Containment of COVID-19 surges and rollout of the vaccines are key to retaining confidence in the recovery.

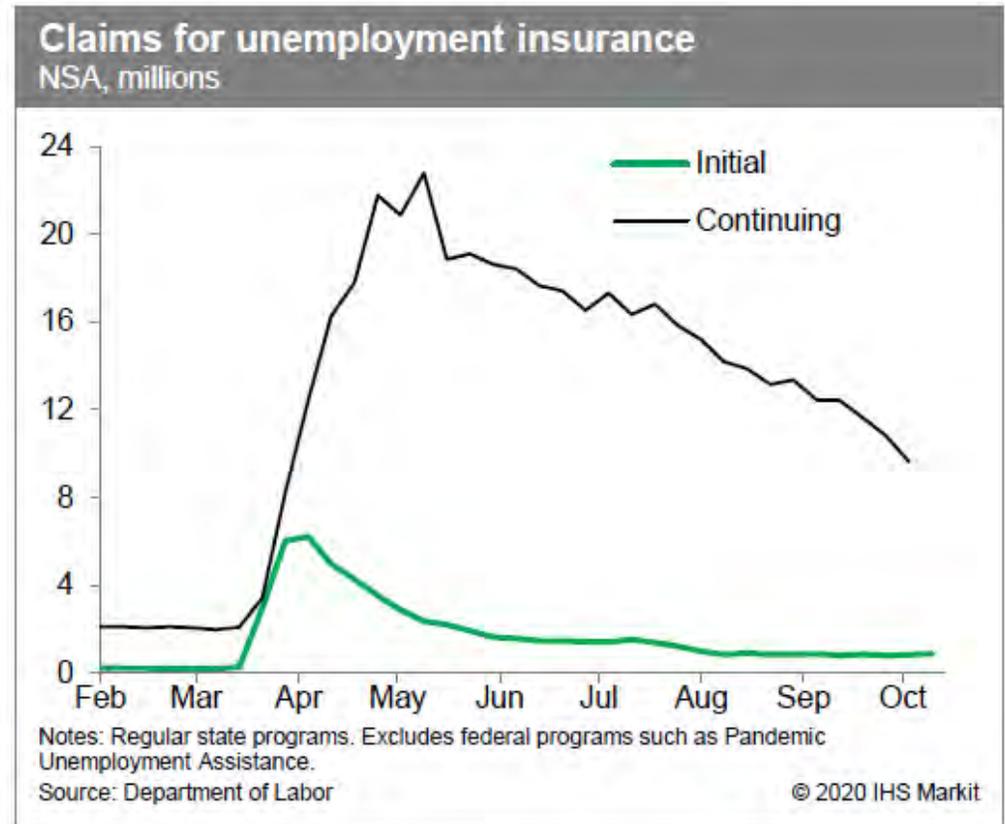


Sources: St. Louis FRED, S&P Dow Jones Indices

U.S. Job Market

Initial claims and total unemployed

- Spike in initial claims to over 6 million per week in April
- Subsided into 3Q, but remain stubbornly high at 837,000 in September
 - Far above prior periods of stress
 - 665,000 in March 2009
- Over 40 million thrown out of work, from a starting payroll count of 155 million in February
 - State unemployment rolls captured 23 million of those jobs lost.
 - Federal Pandemic Unemployment Assistance aided millions more.
- Job increases (>10 million) surprised on the upside during 3Q.
- Household finances sustained through 3Q by expanded unemployment benefits, extra payments, and federal transfer payments.
- Uncertainty over UI benefit extensions and further fiscal stimulus for individuals and small businesses form a dark cloud over continuing recovery in 4Q and 2021.

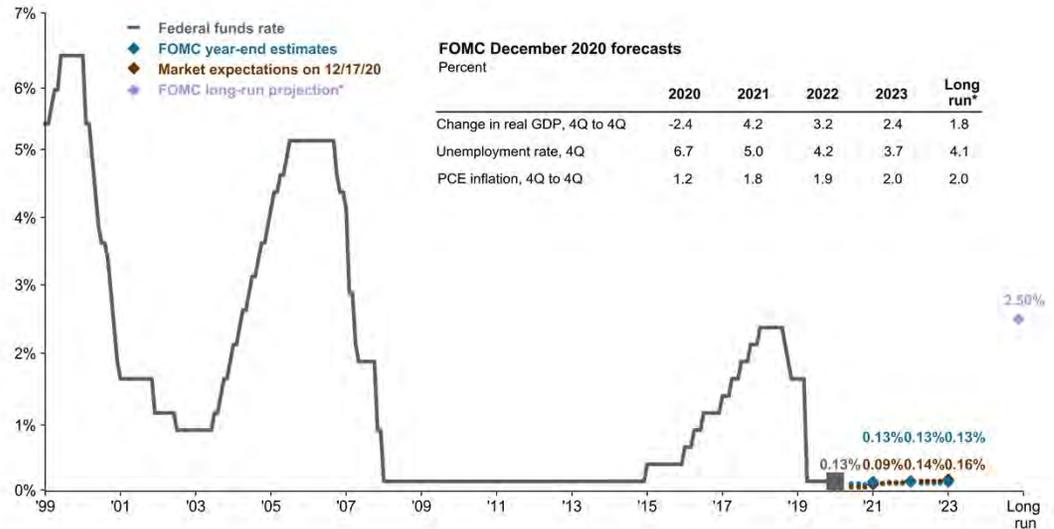


Sources: IHS Markit, Department of Labor

Government Intervention

Monetary policy expected to remain loose for some time

- The Federal Reserve Open Market Committee voted to continue 0% Fed Funds Rate at December meeting.
- Median FOMC member forecast expects zero interest rate policy for two more years.
- Powell: “Fed is not even **thinking** about **thinking** about raising rates.”
- Fed announced a new inflation targeting regime, with willingness to overshoot target to get desired outcome of 2%.
- Markets do not expect the Fed to raise the rate in the near future.
- “Longer run” projection of 2.5% for Fed Funds Rate has no specific anchor date.



Sources: Federal Reserve, J.P. Morgan Guide to the Markets – U.S. Data are as of 12/31/20

Liquidity Supporting Economy (and Driving Markets)

Consumers = more money, fewer problems; investors = dry powder abundant

U.S. Personal Savings Rate



Cash as % of Equity Market Cap



- U.S. personal savings rate far exceeds levels seen in the post-WWII era.
- Savings will help insulate consumer spending during economic wobbles and through uncertainty around future fiscal stimulus.
- Investor cash holdings at 16% of total equity market cap, highest level since 2012

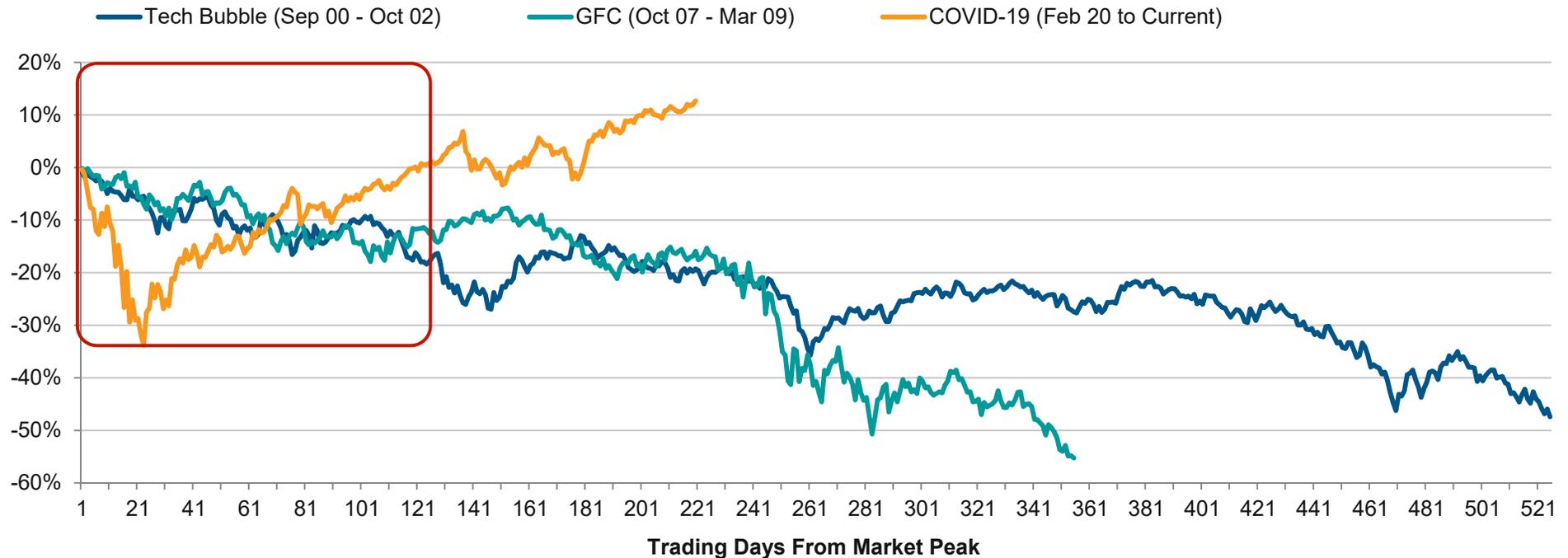
Sources: ClearBridge Investments, FactSet, Federal Reserve. Cash = Institutional and Retail Money Funds – ICL; Equity = MSCI U.S. IMI

Unprecedented Shock to Global Capital Markets—Is It Really Over?

V-shaped recovery in equity—back in black by mid-August, up 18.4% for the year!

S&P 500 Cumulative Returns

Market Peak-to-Trough for Recent Corrections vs. Current Path of COVID-19 Correction Through 12/31/20



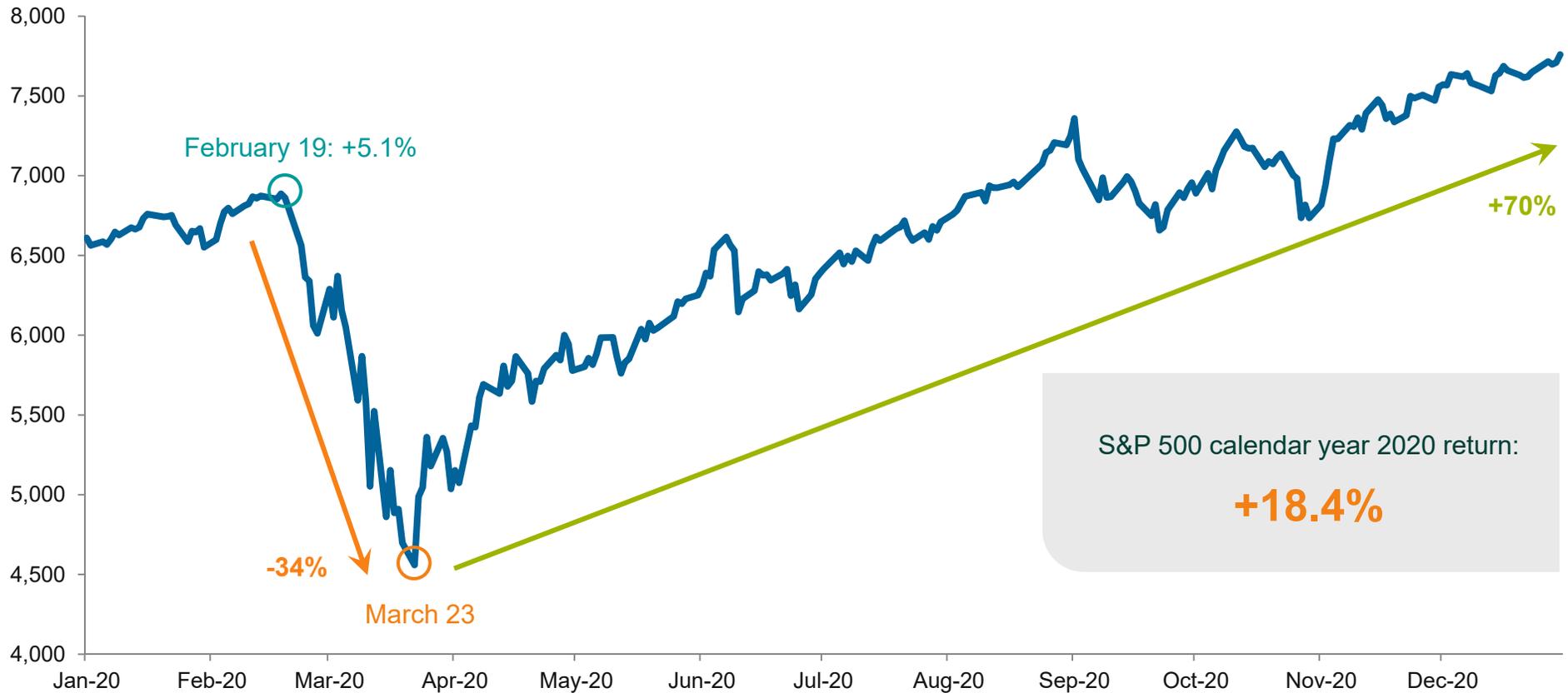
Sharpest and fastest equity market decline ever: 16 trading days to reach bear market; -33% after just 23 days

- Incredible rebound in U.S. equity market in 2Q and 3Q
 - S&P 500 recovered all of its COVID-19 related losses by Aug. 10, only 97 days from the bottom
 - 70% return from the market bottom through Dec. 31, 2020
 - Up 18.4% for the year

Sources: Callan, S&P Dow Jones Indices

U.S. Equity Markets Rebound Over 70%

S&P 500 Total Return Price Index Calendar Year 2020



- Substantial price appreciation in spite of poor earnings
- Low Treasury yields helping to support valuations

Source: S&P Dow Jones Indices
Data as of 12/31/20

Callan Periodic Table of Investment Returns

Monthly Returns												Annual Returns
Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	2020
U.S. Fixed Income	U.S. Fixed Income	U.S. Fixed Income	Small Cap Equity	Small Cap Equity	Emerging Market Equity	Emerging Market Equity	Large Cap Equity	U.S. Fixed Income	Small Cap Equity	Large Cap Equity	Small Cap Equity	Small Cap Equity
1.92%	1.80%	-0.59%	13.74%	6.51%	7.35%	8.94%	7.19%	-0.05%	2.09%	14.02%	8.65%	19.96%
Real Estate	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	Large Cap Equity	Large Cap Equity	Small Cap Equity	Large Cap Equity	Small Cap Equity	Global ex-U.S. Fixed Income	Emerging Market Equity	Small Cap Equity	Emerging Market Equity	Large Cap Equity
0.84%	-0.20%	-3.22%	12.82%	4.76%	3.53%	5.64%	5.63%	-0.58%	2.06%	10.41%	7.35%	18.40%
Global ex-U.S. Fixed Income	High Yield	High Yield	Emerging Market Equity	High Yield	Dev ex-U.S. Equity	High Yield	Dev ex-U.S. Equity	High Yield	High Yield	Emerging Market Equity	Dev ex-U.S. Equity	Emerging Market Equity
0.76%	-1.41%	-11.46%	9.16%	4.41%	3.42%	4.69%	5.16%	-1.03%	0.51%	10.20%	4.55%	18.31%
High Yield	Emerging Market Equity	Large Cap Equity	Real Estate	Dev ex-U.S. Equity	Real Estate	Global ex-U.S. Fixed Income	Real Estate	Emerging Market Equity	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	Large Cap Equity	Global ex-U.S. Fixed Income
0.03%	-5.27%	-12.35%	7.06%	4.25%	2.57%	4.44%	2.52%	-1.60%	0.46%	7.76%	3.84%	10.11%
Large Cap Equity	Large Cap Equity	Dev ex-U.S. Equity	Dev ex-U.S. Equity	Emerging Market Equity	Large Cap Equity	Real Estate	Emerging Market Equity	Dev ex-U.S. Equity	U.S. Fixed Income	U.S. Fixed Income	Real Estate	Dev ex-U.S. Equity
-0.04%	-8.23%	-14.12%	6.97%	0.77%	1.99%	2.78%	2.21%	-2.82%	-0.45%	7.36%	3.51%	7.59%
Dev ex-U.S. Equity	Real Estate	Emerging Market Equity	High Yield	U.S. Fixed Income	Global ex-U.S. Fixed Income	Small Cap Equity	High Yield	Real Estate	Large Cap Equity	High Yield	Global ex-U.S. Fixed Income	U.S. Fixed Income
-1.94%	-8.24%	-15.40%	4.51%	0.47%	1.01%	2.77%	0.95%	-3.11%	-2.66%	5.13%	2.17%	7.51%
Small Cap Equity	Small Cap Equity	Small Cap Equity	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	High Yield	Dev ex-U.S. Equity	Global ex-U.S. Fixed Income	Small Cap Equity	Real Estate	Dev ex-U.S. Equity	High Yield	High Yield
-3.21%	-8.42%	-21.73%	2.04%	0.30%	0.98%	2.66%	0.29%	-3.34%	-3.33%	2.91%	1.88%	7.11%
Emerging Market Equity	Dev ex-U.S. Equity	Real Estate	U.S. Fixed Income	Real Estate	U.S. Fixed Income	U.S. Fixed Income	U.S. Fixed Income	Large Cap Equity	Dev ex-U.S. Equity	Real Estate	U.S. Fixed Income	Real Estate
-4.66%	-8.88%	-22.76%	1.78%	0.23%	0.63%	1.49%	-0.81%	-3.80%	-3.93%	-12.12%	0.14%	-9.04%

Sources: ● Bloomberg Barclays Aggregate ● Bloomberg Barclays Corp High Yield ● Bloomberg Barclays Global Aggregate ex US
 ● FTSE EPRA Nareit Developed ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Stunning Recovery in Global Equity Markets in 4Q20

V-shaped rebound, ahead of the global economy

Global equity continued rally in 4Q

- S&P -33.5% from peak (02/19/20) to low on 3/23/20
- Rebound since March bottom lifted the S&P 500 by 70% through December! However, the strong recovery was concentrated in a few stocks: mega cap, IT.
- Fed cut rates to zero, commenced QE, instituted multiple facilities to backstop money markets, credit markets, and the economy.
 - *Fed expects to get paid back.*
 - *Further fiscal stimulus added at year-end*
- Economic recovery will be uncertain in 2021.
- Release of vaccines a huge positive development
- Distribution challenges may keep widespread inoculation from being achieved until mid-year.
- As COVID-19 infections surge anew, re-openings may be reversed in many states and localities.

Returns for Periods ended 12/31/20

	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	14.68	20.89	15.43	13.79	9.67
S&P 500	12.15	18.40	15.22	13.88	9.56
Russell 2000	31.37	19.96	13.26	11.20	9.05
Global ex-U.S. Equity					
MSCI World ex USA	15.85	7.59	7.64	5.19	5.17
MSCI Emerging Markets	19.70	18.31	12.81	3.63	--
MSCI ACWI ex USA Small Cap	18.56	14.24	9.37	5.95	6.49
Fixed Income					
Bloomberg Barclays Aggregate	0.67	7.51	4.44	3.84	5.16
90-day T-Bill	0.03	0.67	1.20	0.64	2.27
Bloomberg Barclays Long Gov/Credit	1.68	16.12	9.35	8.16	7.42
Bloomberg Barclays Global Agg ex-US	5.09	10.11	4.89	1.99	3.97
Real Estate					
NCREIF Property	0.74	1.19	5.82	8.96	9.08
FTSE Nareit Equity	11.57	-8.00	4.77	8.31	9.64
Alternatives					
CS:Hedge Fund Idx*	3.44	2.41	2.76	3.64	7.25
Cambridge Private Equity*	10.82	18.54	13.90	13.85	15.41
Bloomberg Commodity	10.19	-3.12	1.03	-6.50	1.00
Gold Spot Price	-0.02	24.42	12.32	2.92	6.55
Inflation - CPI-U	0.07	1.36	1.59	1.66	2.10

*Cambridge PE data through 09/30/20; CS Hedge Fund Index data through 9/30/20

Sources: Bloomberg, Bloomberg Barclays, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

Asset Prices Experienced Significant Swings in 2020

Calendar year 2020 performance



Source: Visual Capitalist

New Market Peaks in Year of the Pandemic

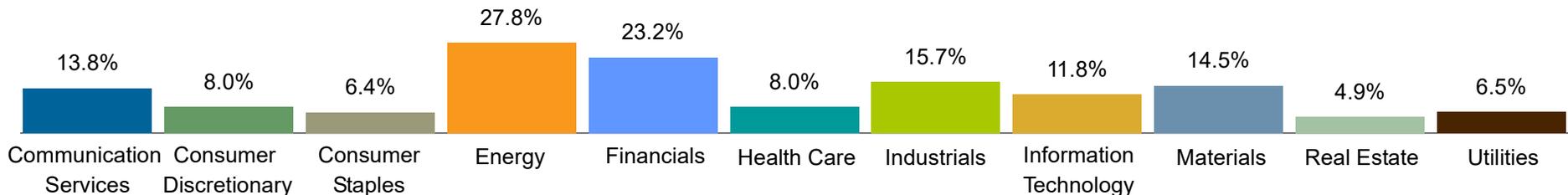
Record highs in 2020

- The S&P 500 Index hit a record high in 4Q20. The Index was up 12.1% for the quarter, bringing the 2020 gain to 18.4%.
 - Since March low, S&P is up over 70%, with all sectors posting increases greater than 40%.
 - 4Q winner: Energy (+28%), but down 34% for the year
 - Technology (+12% in 4Q) top 2020 sector with 44% gain
 - Pandemic has cast a pall over certain sectors while rewarding others: online retail soared 69% in 2020, while hotels/cruise lines, airlines, and retail REITs dropped ~30%.
 - Apple, Microsoft, Amazon, Facebook, Alphabet made up 22% of S&P 500 at year-end, and for 2020, accounted for 12.1% of 18.4% Index return.

Anti-momentum rally

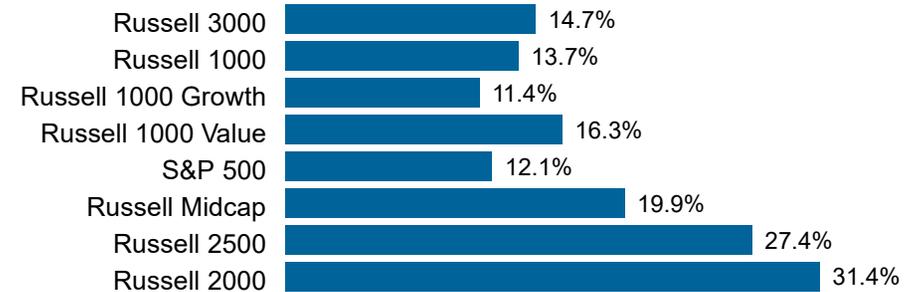
- In 4Q, driven by vaccine progress, political clarity, and further stimulus, value outperformed growth across the cap spectrum. However, value trails growth by significant margin for the full year.
- Fueled by the prospect of an economic recovery, small caps outperformed large in 4Q but were even on the year. Small value was the best performer for 4Q, but 2020 gain is a mere 4.6%.

Industry Sector Quarterly Performance (S&P 500)

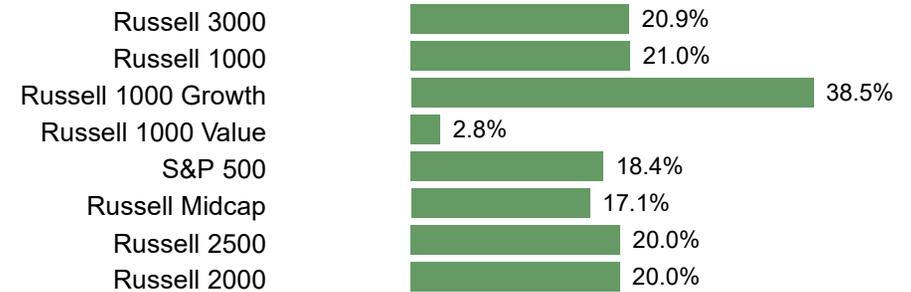


Sources: FTSE Russell, S&P Dow Jones Indices

U.S. Equity: Quarterly Returns



U.S. Equity: One-Year Returns



Global ex-U.S. Equity Performance

COVID-19 vaccine rollouts extend and expand risk-on rally

- Prospects of global economic recovery propelled by COVID-19 vaccination fueled double-digit returns broadly across developed and emerging markets.
- Expectations of reverting back to normal economic activity by late 2021 enabled risk assets to thrive.
- Emerging markets outperformed developed markets, led by LATAM—specifically Brazil.
- Small cap outperformed large as business confidence improved with news of vaccination.

Market rotates to cyclicals

- Positive outlook on reflation trade stoked Energy, Materials, and Financials to drive the market.
- Beta and volatility led factor performance due to market rotation.

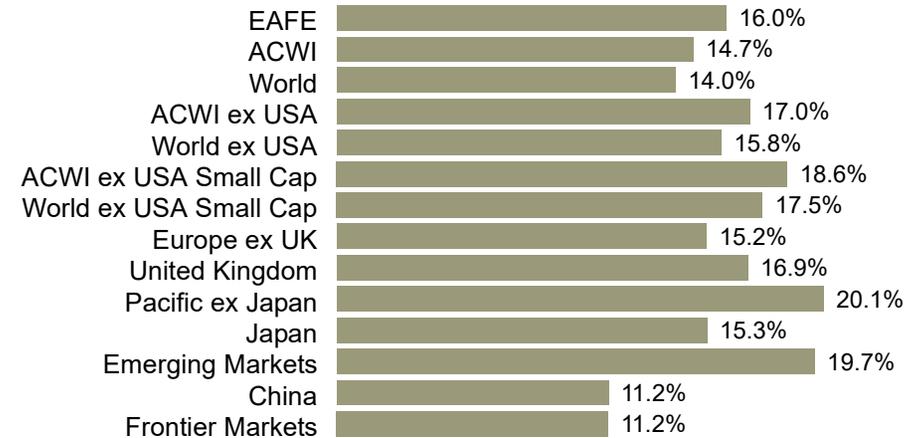
U.S. dollar vs. other currencies

- U.S. dollar continued to lose ground as appetite for risk increased with the expectation that a path to global economic recovery is on the horizon.

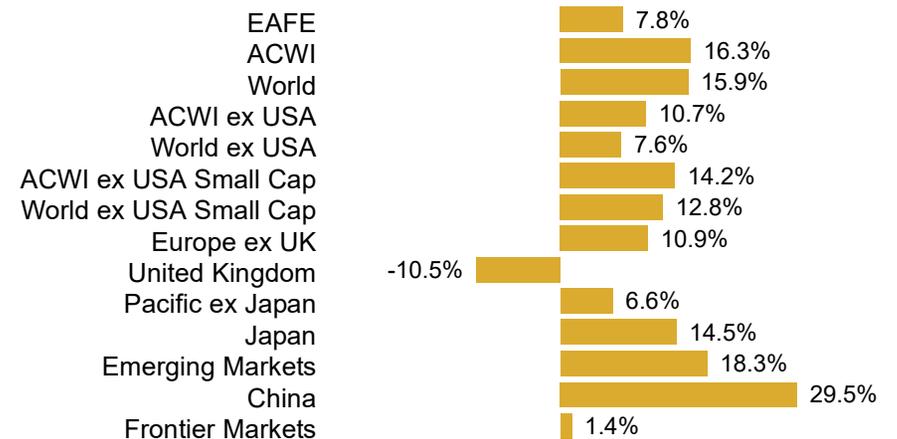
Growth vs. value

- Value outpaced growth as sentiment shifted to cyclical sectors.

Global Equity: Quarterly Returns



Global Equity: One-Year Returns



Source: MSCI

U.S. Fixed Income Performance: 4Q20

Treasury yields rose

- The 10-year U.S. Treasury yield closed 4Q20 at 0.93%, up 24 bps from 3Q20 but off from the year-end level of 1.92%.
- TIPS outperformed nominal U.S. Treasuries as 10-year breakeven spreads widened from 163 bps to 199 bps.
- No rate hikes are expected until at least 2023.

Bloomberg Barclays Aggregate gained slightly

- Corporate credit outperformed treasuries as investors continued to hunt for yield.
- Corporate credit ended the year up 9.89% despite record issuance in 2020.

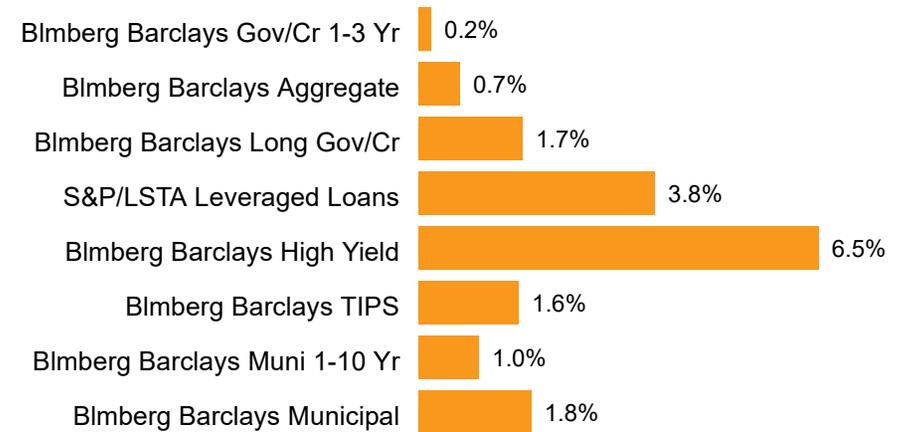
High yield bonds gained on the quarter as rally extended

- High yield bonds outperformed IG in 4Q, returning 6.48%, but trailed IG for the year.
- Leveraged loans gained 3.8% as demand remained strong to finish the year.

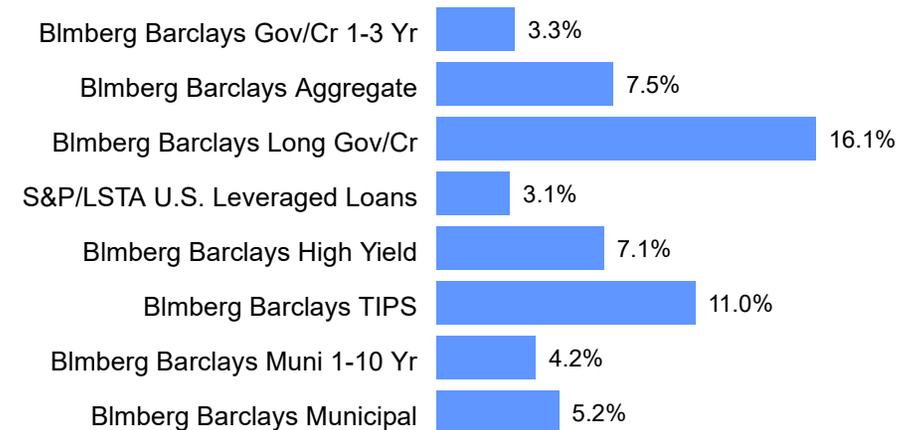
Munis boosted by favorable supply/demand dynamics

- Municipals outperformed Treasuries for the quarter, but remained down for the year.
- Tax-exempt issuance was muted amid strong demand.
- Lower quality outperformed for the quarter; however, higher quality outperformed for the year.

U.S. Fixed Income: Quarterly Returns



U.S. Fixed Income: One-Year Returns



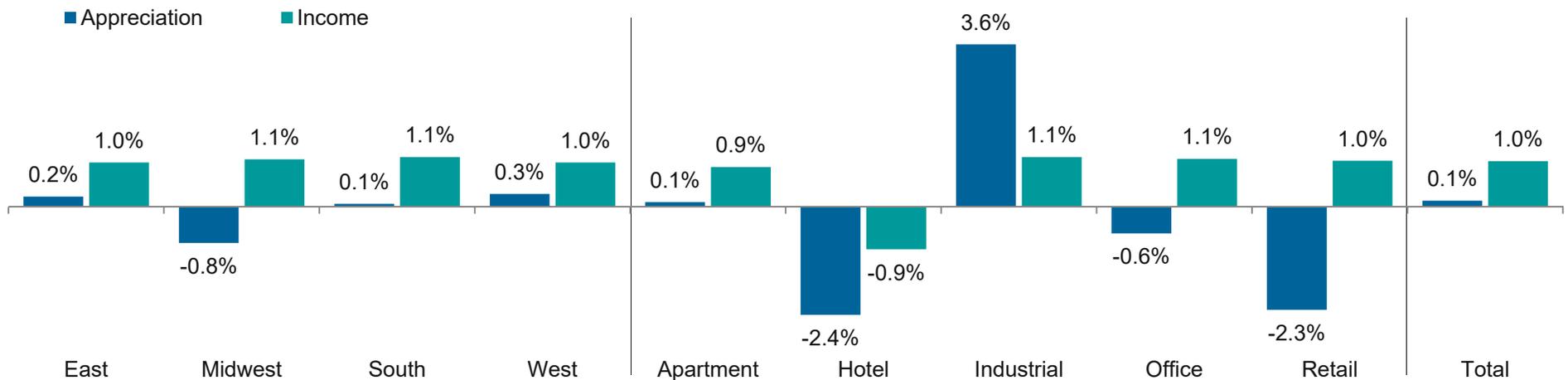
U.S. Private Real Estate Market Trends

Results

- Hotel and Retail are the most challenged sectors while Office faces uncertainty; Industrial remains the best performer.
- Income remains positive except in Hotel sector.
- Appraisers have more certainty on pandemic’s impact on valuations.
- Return dispersion by manager within the ODCE Index due to composition of underlying portfolios

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
NCREIF ODCE	1.3%	1.2%	4.9%	6.2%	9.9%
Income	0.9%	3.9%	4.1%	4.2%	4.8%
Appreciation	0.4%	-2.6%	0.8%	1.9%	5.0%
NCREIF Property Index	1.1%	1.6%	4.9%	5.9%	9.0%
Income	1.0%	4.2%	4.4%	4.6%	5.1%
Appreciation	0.1%	-2.5%	0.4%	1.3%	3.8%

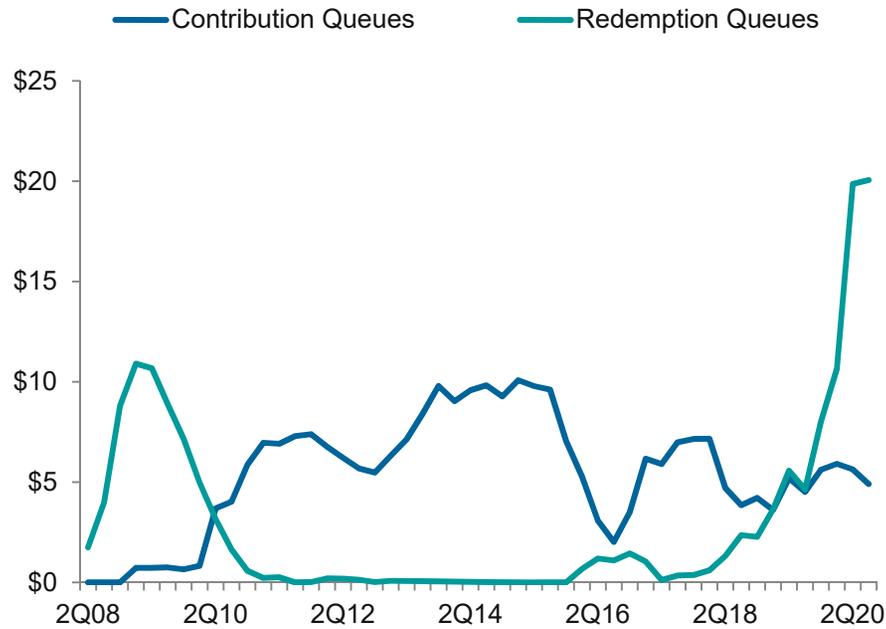
NCREIF Property Index Returns by Region and Property Type



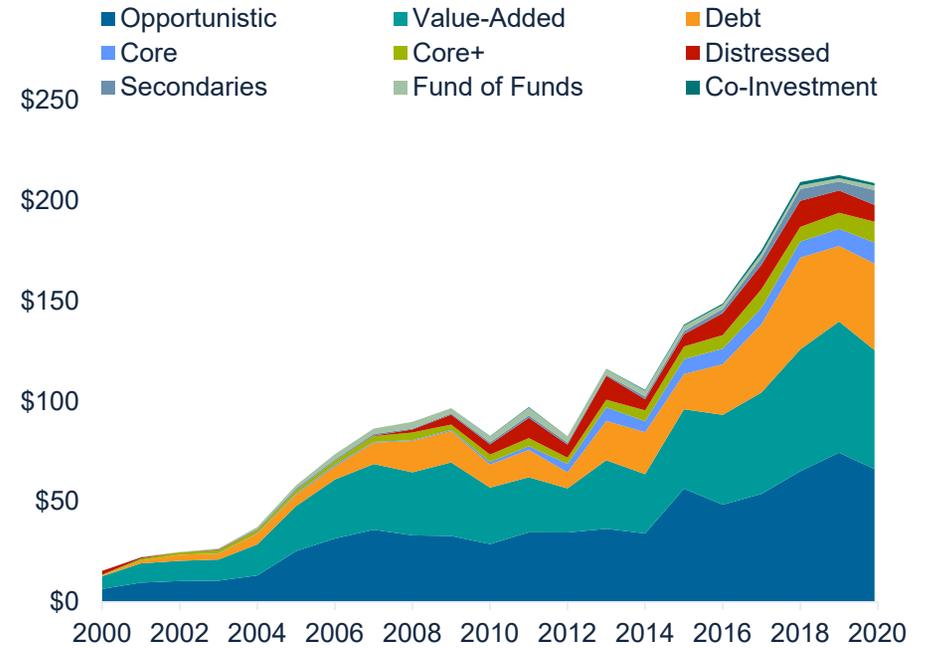
Source: NCREIF

U.S. Private Real Estate Market Trends

Core Fund Contribution/Redemption Queues (\$bn)



Dry Powder Available for CRE investment in North America (\$bn)



- U.S. core open end funds have investment queues of roughly \$5 billion and exit queues of \$20 billion.
- >\$200 billion of capital waiting to be deployed in North America
- Majority of dry powder capital in opportunistic, value-add, and debt funds

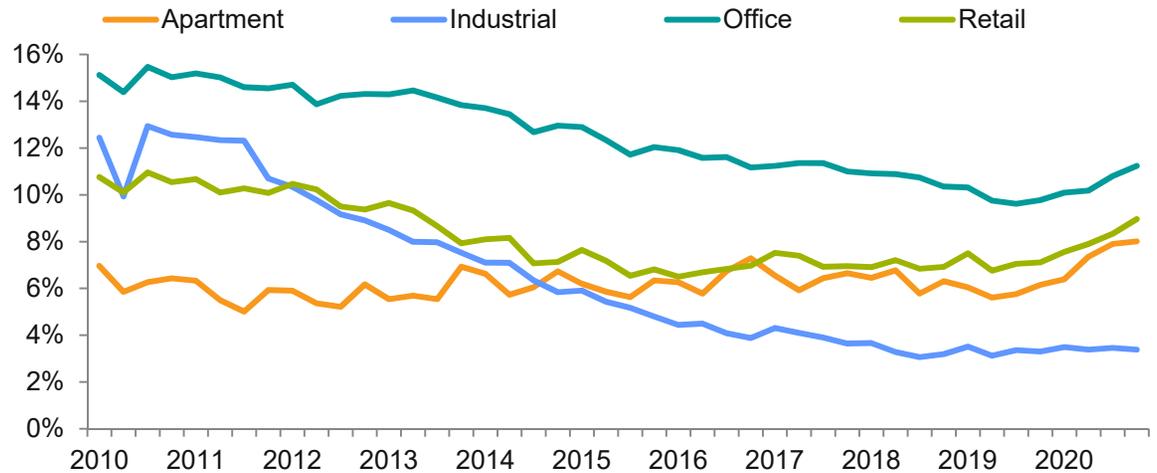
Sources: NCIF, Prequin

U.S. Private Real Estate Market Trends

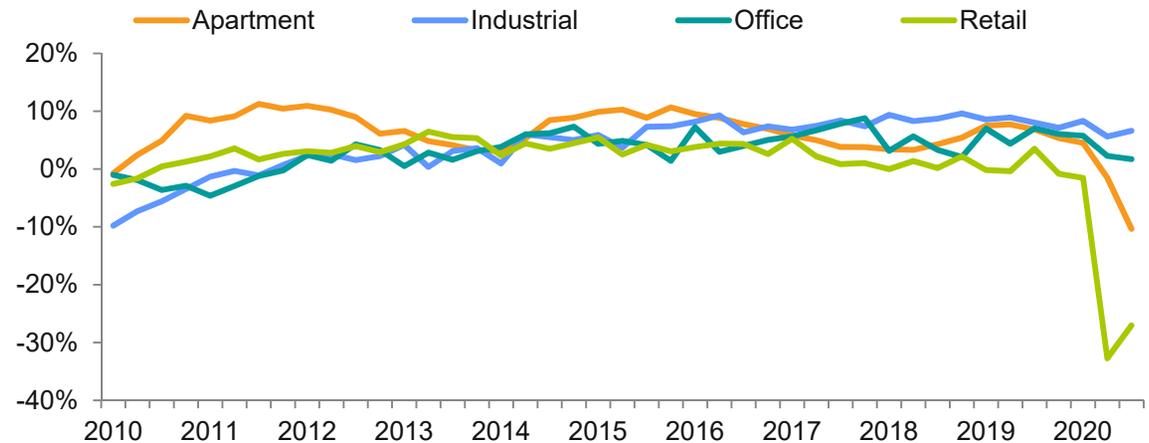
U.S. real estate fundamentals

- Vacancy rates for all property types are or will be impacted.
- Net operating income has declined as retail continues to suffer.
- 4Q rent collections showed relatively stable income throughout the quarter in the Industrial, Apartment, and Office sectors. The Retail sector remains challenged, with regional malls impacted most heavily.
- Class A/B urban apartments relatively strong, followed by certain types of Industrial and Office.
- Supply was in check before the pandemic.
- Construction is limited to finishing up existing projects but has been hampered by shelter in place and material shortages.
- New construction of preleased industrial and multifamily is occurring.

Vacancy by Property Type



Rolling 4-Quarter NOI Growth by Property Type



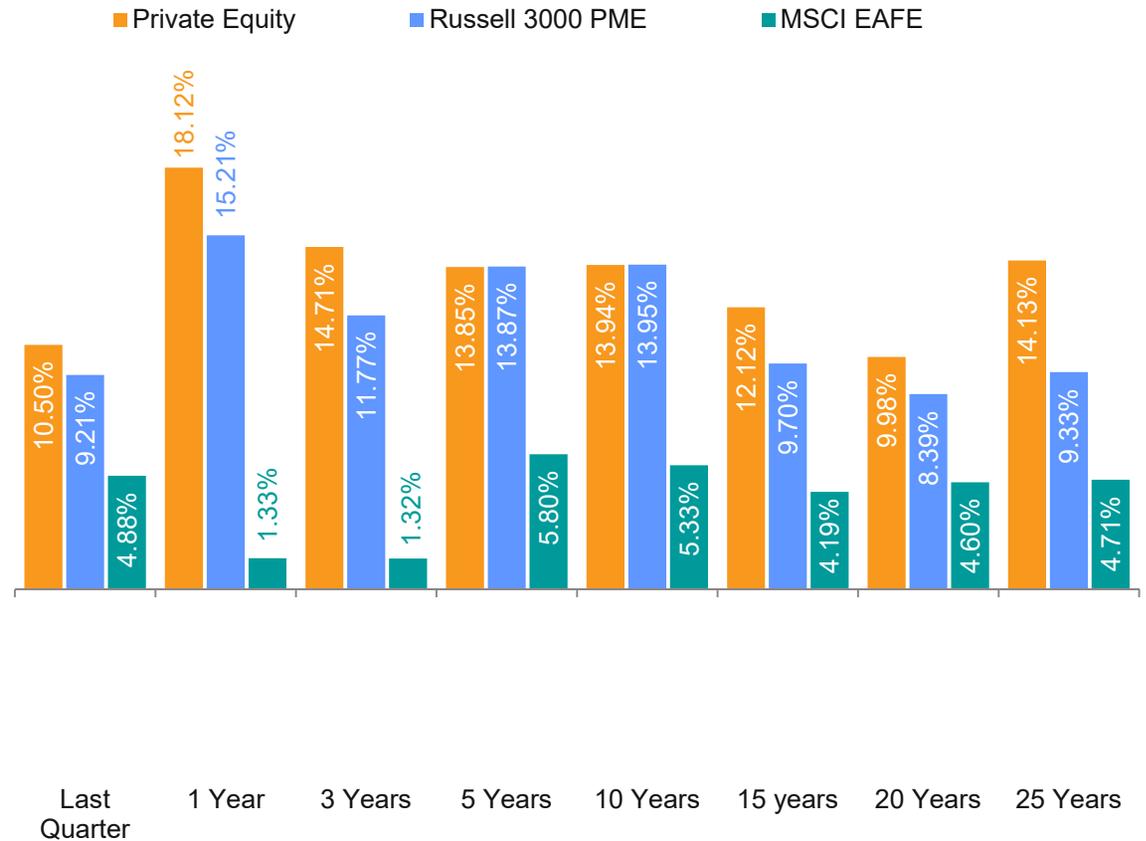
Source: NCREIF

Private Equity Performance

Gains YTD

- Private equity 3Q20 gains ahead of those of public equity
- Private equity performance positive YTD, notably outperforming public equity
- Private equity outperforms public equity across all longer-term time horizons, except over the last 10 years.

Net IRRs as of 9/30/20



Source: Refinitiv/Cambridge

Private Equity Market Opportunities

Distressed for Control

Focus on managers that can invest/create the right security to mitigate the downside and maximize the value of the assets

Deep Value/Turnaround

Tangential opportunity to distressed—cyclical or troubled companies in need of capital

Complex Carveouts

Focus on solution providers to take advantage of stretched balance sheets and banks pulling back

Health Care

A continued long-term opportunity given the issues laid bare by COVID-19

Growth Buyouts

Good, brand-name growth-oriented businesses expected to need capital; entry points expected to be relatively attractive

Secondaries

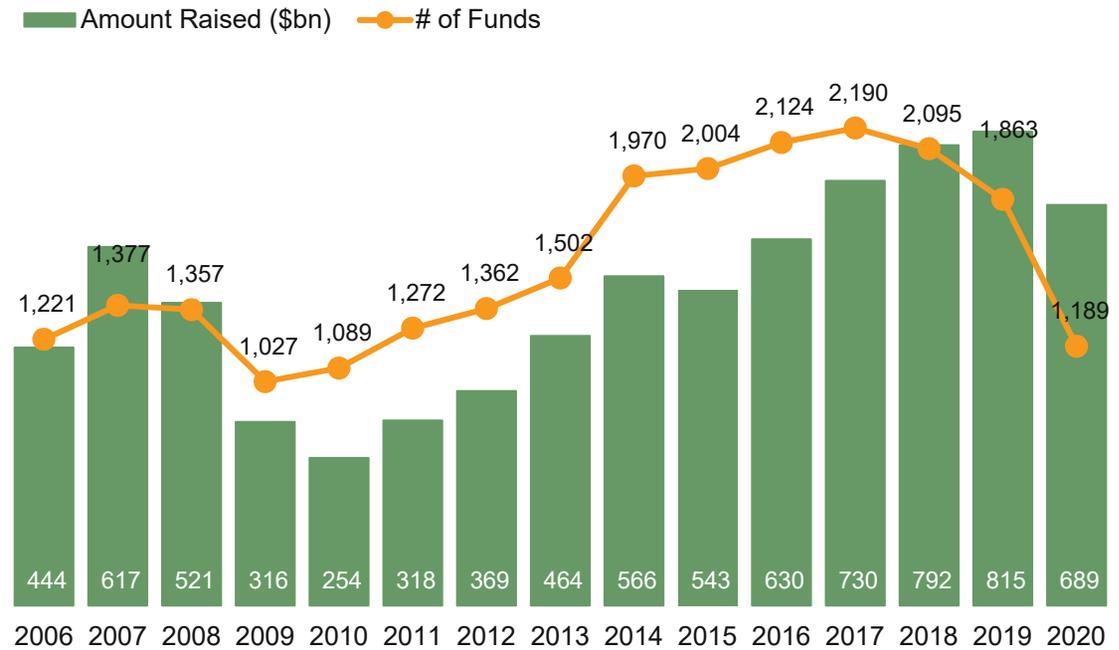
Potentially larger discounts for private equity secondary transactions

Private Equity Global Fundraising

Slowdown during pandemic

- Fundraising for 2020 at 85% of 2019 levels
- Many fundraises pushed out to 2021 due to worries over investor appetite and inability of funds to deploy capital during the onset of the pandemic.
- Fundraising expected to pick up in 2021

Annual Fundraising



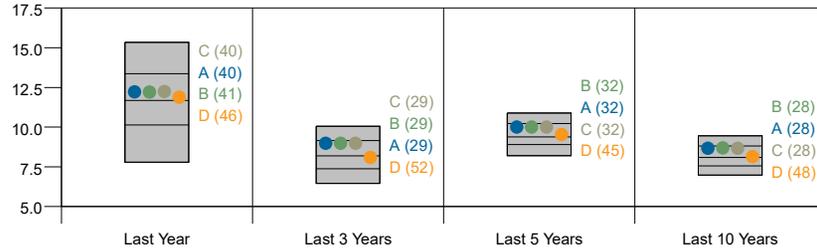
Source: PitchBook, includes private equity and private debt

Callan

Pension Plan

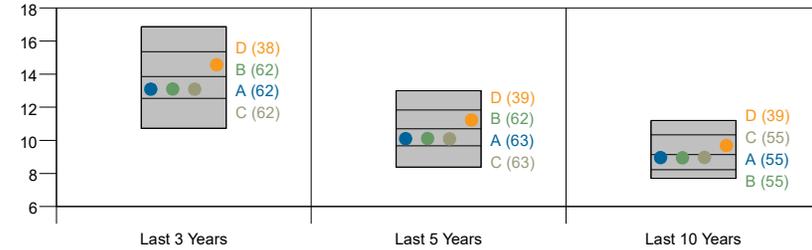
PERS, TRS, and JRS Performance Dashboard – December 31, 2020

Returns vs Callan Public Fund Sponsor Database



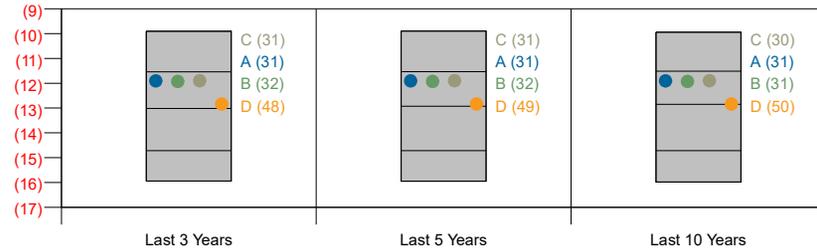
10th Percentile	15.34	10.06	10.89	9.46
25th Percentile	13.37	9.15	10.23	8.81
Median	11.68	8.19	9.39	8.10
75th Percentile	10.14	7.39	8.91	7.57
90th Percentile	7.80	6.46	8.20	6.98
Member Count	211	210	209	198
Employees' Total Plan	12.23	8.99	10.01	8.68
Teachers' Total Plan	12.21	8.99	10.01	8.70
Judicial Total Plan	12.25	8.99	10.01	8.67
Policy Target	11.89	8.09	9.54	8.15

Standard Deviation vs Callan Public Fund Sponsor Database



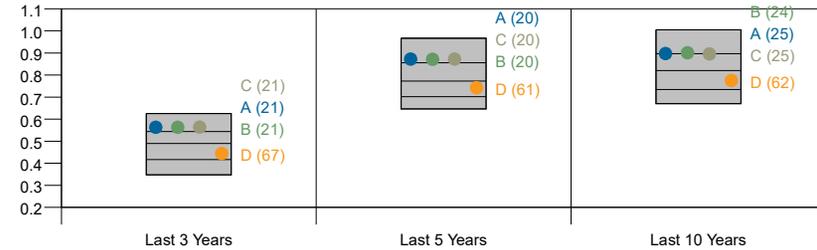
10th Percentile	16.88	13.00	11.20
25th Percentile	15.36	11.84	10.33
Median	13.86	10.70	9.15
75th Percentile	12.54	9.67	8.24
90th Percentile	10.72	8.38	7.72
Member Count	210	209	198
Employees' Total Plan	13.09	10.10	8.96
Teachers' Total Plan	13.11	10.11	8.96
Judicial Total Plan	13.09	10.10	8.97
Policy Target	14.58	11.24	9.69

Maximum Drawdown vs Callan Public Fund Sponsor Database



10th Percentile	(9.89)	(9.89)	(9.93)
25th Percentile	(11.54)	(11.53)	(11.51)
Median	(13.01)	(12.92)	(12.84)
75th Percentile	(14.71)	(14.71)	(14.71)
90th Percentile	(15.93)	(15.94)	(15.97)
Member Count	210	209	198
Employees' Total Plan	(11.90)	(11.90)	(11.90)
Teachers' Total Plan	(11.92)	(11.92)	(11.92)
Judicial Total Plan	(11.89)	(11.89)	(11.89)
Policy Target	(12.83)	(12.83)	(12.83)

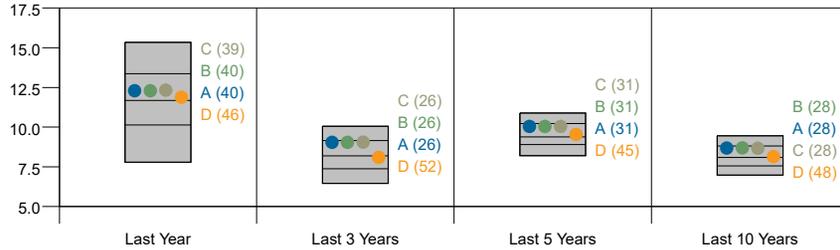
Sharpe Ratio vs Callan Public Fund Sponsor Database



10th Percentile	0.63	0.97	1.01
25th Percentile	0.54	0.86	0.90
Median	0.49	0.77	0.82
75th Percentile	0.42	0.70	0.74
90th Percentile	0.35	0.65	0.67
Member Count	210	209	198
Employees' Total Plan	0.56	0.87	0.90
Teachers' Total Plan	0.56	0.87	0.90
Judicial Total Plan	0.56	0.87	0.90
Policy Target	0.45	0.74	0.78

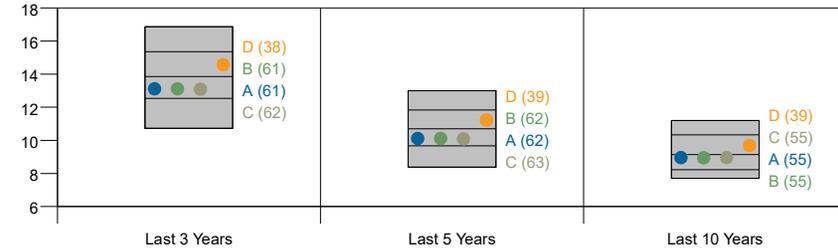
Health Care Plans Performance Dashboard – December 31, 2020

Returns vs Callan Public Fund Sponsor Database



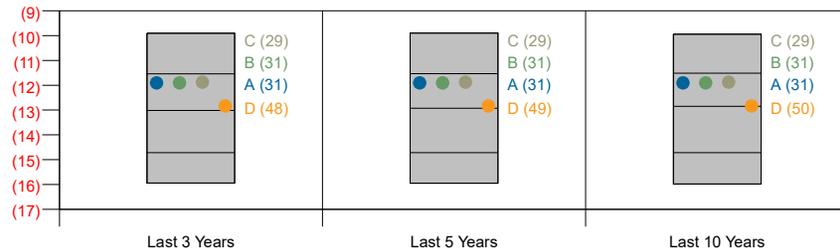
10th Percentile	15.34	10.06	10.89	9.46
25th Percentile	13.37	9.15	10.23	8.81
Median	11.68	8.19	9.39	8.10
75th Percentile	10.14	7.39	8.91	7.57
90th Percentile	7.80	6.46	8.20	6.98
Member Count	211	210	209	198
PERS Health Plan	● A 12.30	● A 9.05	● A 10.04	● A 8.68
TRS Health Plan	● B 12.30	● B 9.05	● B 10.04	● B 8.70
JRS Health Plan	● C 12.34	● C 9.06	● C 10.05	● C 8.67
Policy Target	● D 11.89	● D 8.09	● D 9.54	● D 8.15

Standard Deviation vs Callan Public Fund Sponsor Database



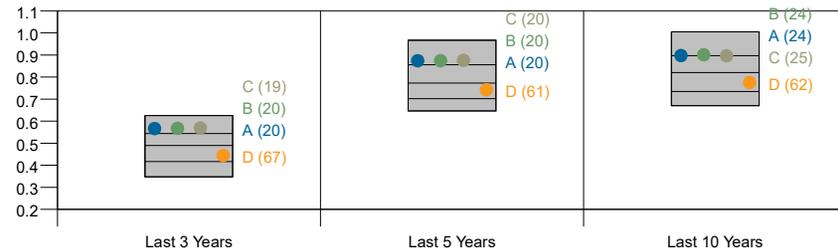
10th Percentile	16.88	13.00	11.20
25th Percentile	15.36	11.84	10.33
Median	13.86	10.70	9.15
75th Percentile	12.54	9.67	8.24
90th Percentile	10.72	8.38	7.72
Member Count	210	209	198
PERS Health Plan	● A 13.12	● A 10.12	● A 8.96
TRS Health Plan	● B 13.12	● B 10.12	● B 8.95
JRS Health Plan	● C 13.10	● C 10.10	● C 8.96
Policy Target	● D 14.58	● D 11.24	● D 9.69

Maximum Drawdown vs Callan Public Fund Sponsor Database



10th Percentile	(9.89)	(9.89)	(9.93)
25th Percentile	(11.54)	(11.53)	(11.51)
Median	(13.01)	(12.92)	(12.84)
75th Percentile	(14.71)	(14.71)	(14.71)
90th Percentile	(15.93)	(15.94)	(15.97)
Member Count	210	209	198
PERS Health Plan	● A (11.90)	● A (11.90)	● A (11.90)
TRS Health Plan	● B (11.90)	● B (11.90)	● B (11.90)
JRS Health Plan	● C (11.87)	● C (11.87)	● C (11.87)
Policy Target	● D (12.83)	● D (12.83)	● D (12.83)

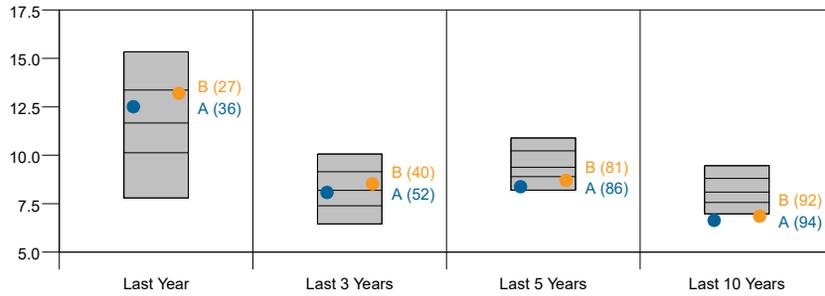
Sharpe Ratio vs Callan Public Fund Sponsor Database



10th Percentile	0.63	0.97	1.01
25th Percentile	0.54	0.86	0.90
Median	0.49	0.77	0.82
75th Percentile	0.42	0.70	0.74
90th Percentile	0.35	0.65	0.67
Member Count	210	209	198
PERS Health Plan	● A 0.57	● A 0.87	● A 0.90
TRS Health Plan	● B 0.57	● B 0.87	● B 0.90
JRS Health Plan	● C 0.57	● C 0.88	● C 0.90
Policy Target	● D 0.45	● D 0.74	● D 0.78

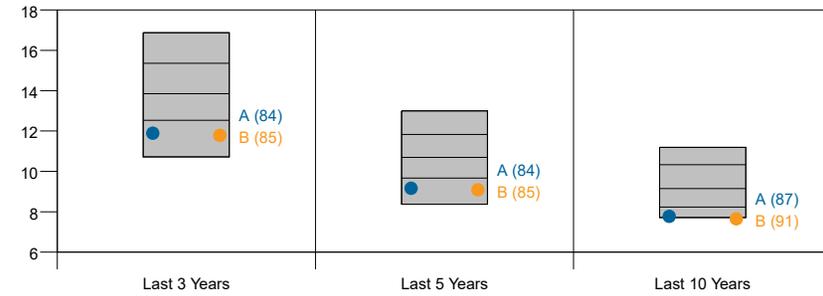
Military Plan Performance Dashboard – December 31, 2020

Returns vs Callan Public Fund Sponsor Database



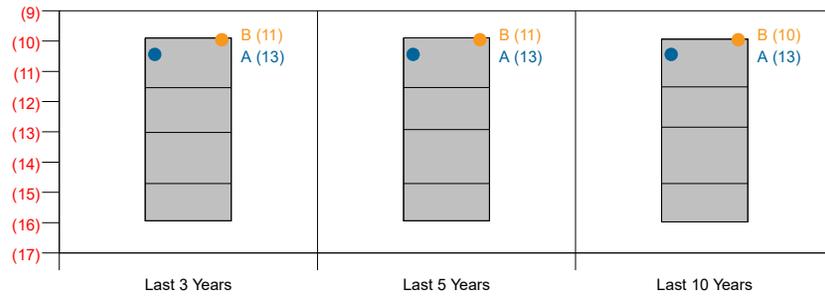
10th Percentile	15.34	10.06	10.89	9.46
25th Percentile	13.37	9.15	10.23	8.81
Median	11.68	8.19	9.39	8.10
75th Percentile	10.14	7.39	8.91	7.57
90th Percentile	7.80	6.46	8.20	6.98
Member Count	211	210	209	198
Military Total Plan	● A			
Military Policy Target	● B			

Standard Deviation vs Callan Public Fund Sponsor Database



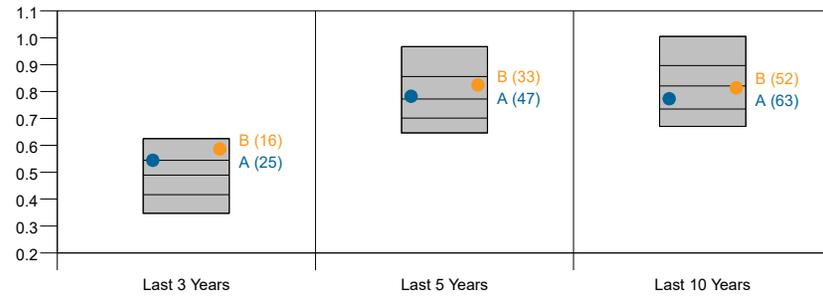
10th Percentile	16.88	13.00	11.20
25th Percentile	15.36	11.84	10.33
Median	13.86	10.70	9.15
75th Percentile	12.54	9.67	8.24
90th Percentile	10.72	8.38	7.72
Member Count	210	209	198
Military Total Plan	● A		
Military Policy Target	● B		

Maximum Drawdown vs Callan Public Fund Sponsor Database



10th Percentile	(9.89)	(9.89)	(9.93)
25th Percentile	(11.54)	(11.53)	(11.51)
Median	(13.01)	(12.92)	(12.84)
75th Percentile	(14.71)	(14.71)	(14.71)
90th Percentile	(15.93)	(15.94)	(15.97)
Member Count	210	209	198
Military Total Plan	● A		
Military Policy Target	● B		

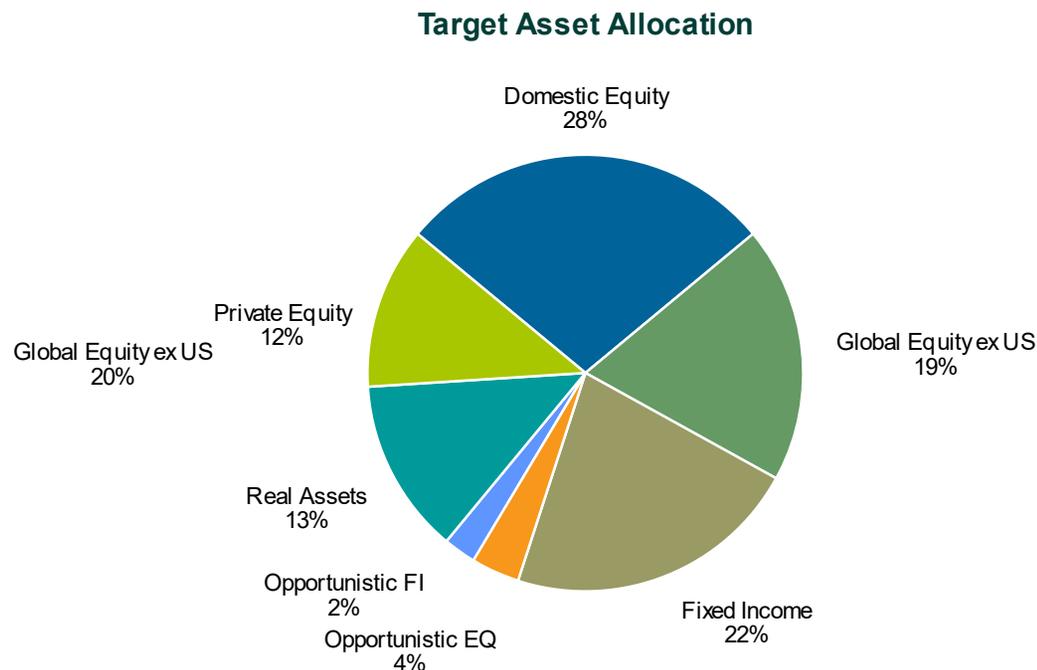
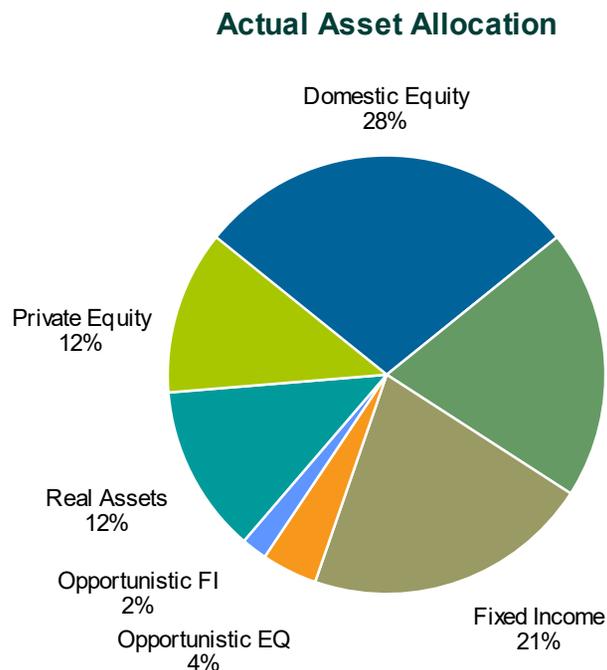
Sharpe Ratio vs Callan Public Fund Sponsor Database



10th Percentile	0.63	0.97	1.01
25th Percentile	0.54	0.86	0.90
Median	0.49	0.77	0.82
75th Percentile	0.42	0.70	0.74
90th Percentile	0.35	0.65	0.67
Member Count	210	209	198
Military Total Plan	● A		
Military Policy Target	● B		

Asset Allocation – Public Employees’ Retirement System

Quarter Ending December 31, 2020



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	3,061,340	28.5%	28.0%	0.5%	49,791
Global Equity ex US	2,136,412	19.9%	19.0%	0.9%	92,861
Fixed Income	2,280,213	21.2%	22.0%	(0.8%)	(86,004)
Opportunistic EQ	443,680	4.1%	3.6%	0.5%	56,481
Opportunistic FI	205,079	1.9%	2.4%	(0.5%)	(53,053)
Real Assets	1,331,326	12.4%	13.0%	(0.6%)	(66,893)
Private Equity	1,297,482	12.1%	12.0%	0.1%	6,818
Total	10,755,532	100.0%	100.0%		

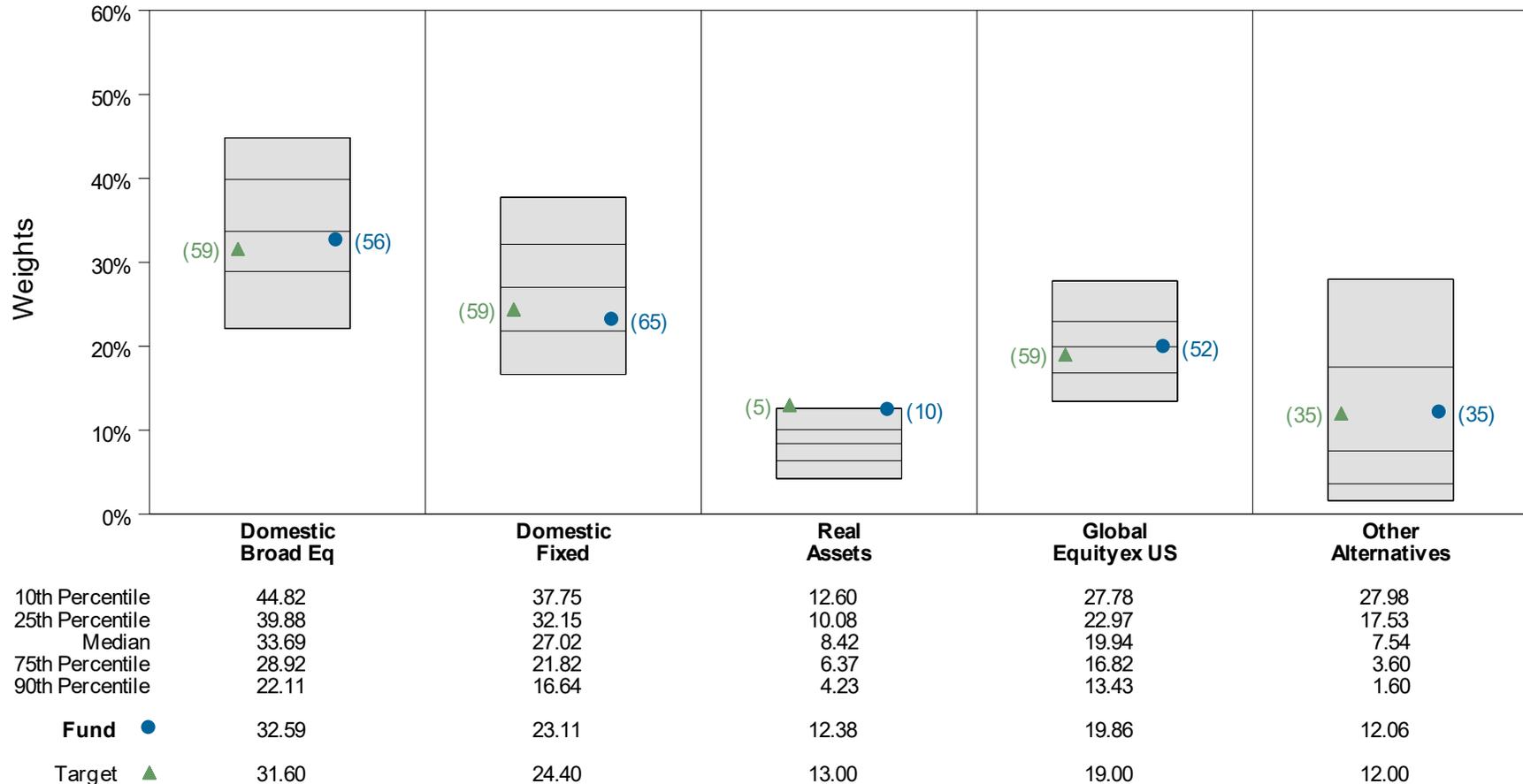
PERS is used as illustrative throughout the presentation.

The other plans exhibit similar modest and understandable variations from strategic target allocations.

Asset Allocation vs. Public Funds (PERS)

Callan Public Fund Database

Asset Class Weights vs Callan Public Fund Sponsor Database



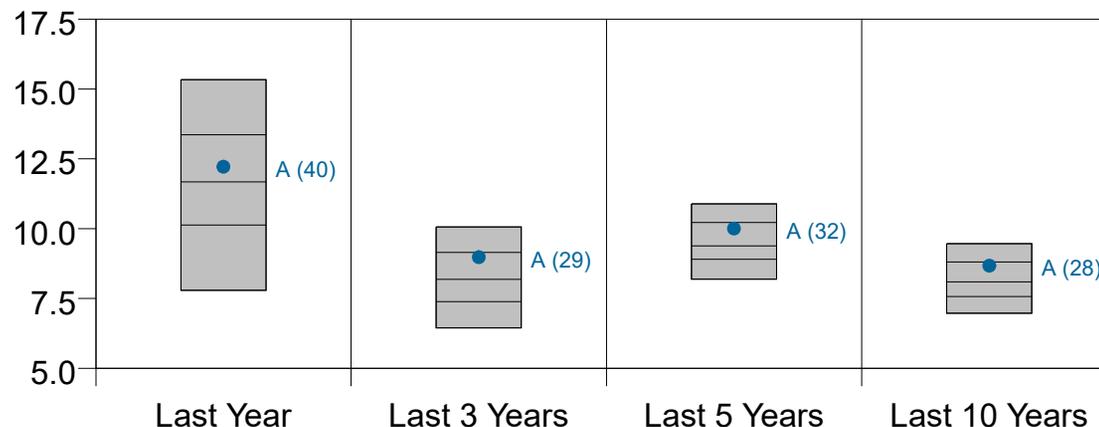
- Asset class allocations are in line with targets after the recent asset allocation update and associated rebalancing.
- Weightings to real assets and alternatives are relatively high in comparison to other public funds.

Notes: Real Assets includes Private Real Estate, REITs, Farmland, Timber, Energy, and Infrastructure. Other Alternatives represents private equity.

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Returns
for Periods Ended December 31, 2020
Group: Callan Public Fund Sponsor Database



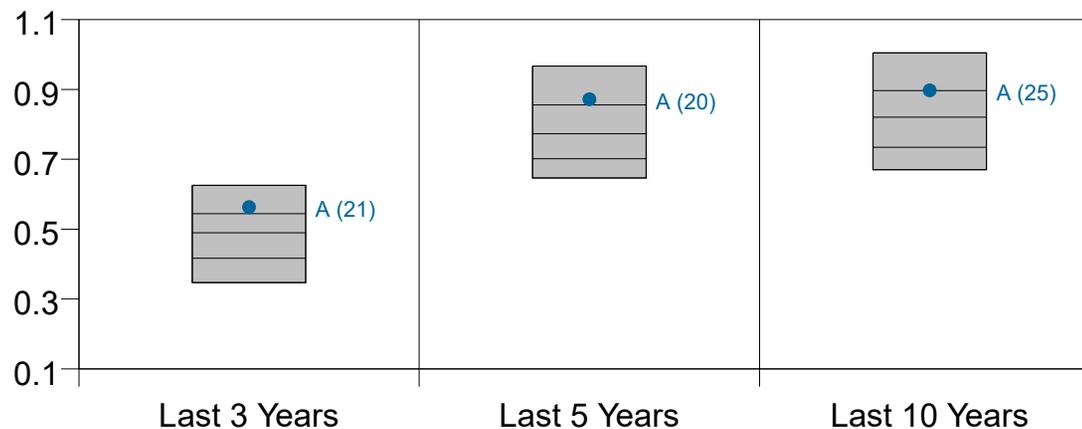
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	15.34	10.06	10.89	9.46
25th Percentile	13.37	9.15	10.23	8.81
Median	11.68	8.19	9.39	8.10
75th Percentile	10.14	7.39	8.91	7.57
90th Percentile	7.80	6.46	8.20	6.98
Member Count	211	210	209	198
PERS - Total Fund ● A	12.23	8.99	10.01	8.68

- Despite the recent change to the asset allocation, longer-term performance reflects ARMB's prior orientation toward capital growth as opposed to income generation.
- Performance was above the Public Funds median for the one-, three-, five-, and ten-year periods.

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Sharpe Ratio
for Periods Ended December 31, 2020
Group: Callan Public Fund Sponsor Database



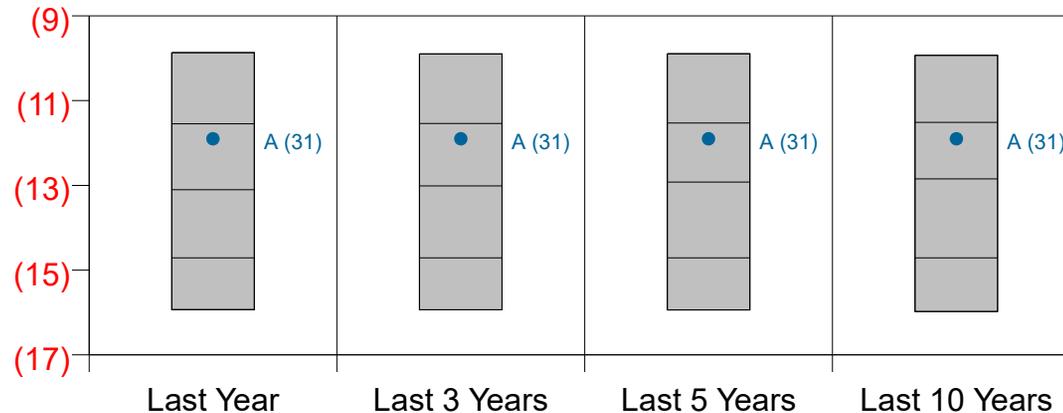
	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.63	0.97	1.01
25th Percentile	0.54	0.86	0.90
Median	0.49	0.77	0.82
75th Percentile	0.42	0.70	0.74
90th Percentile	0.35	0.65	0.67
Member Count	210	209	198
PERS - Total Fund ● A	0.56	0.87	0.90

- “Sharpe ratio” is a risk-adjusted measure of excess return above the risk-free rate.
- ARMB’s risk-adjusted return (Sharpe ratio) was above the Public Funds median for the three-, five-, and 10-year periods.

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Gross of Fee Maximum Drawdown
for Periods Ended December 31, 2020
Group: Callan Public Fund Sponsor Database



	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	(9.87)	(9.89)	(9.89)	(9.93)
25th Percentile	(11.55)	(11.54)	(11.53)	(11.51)
Median	(13.10)	(13.01)	(12.92)	(12.84)
75th Percentile	(14.71)	(14.71)	(14.71)	(14.71)
90th Percentile	(15.93)	(15.93)	(15.94)	(15.97)

Member Count	211	210	209	198
--------------	-----	-----	-----	-----

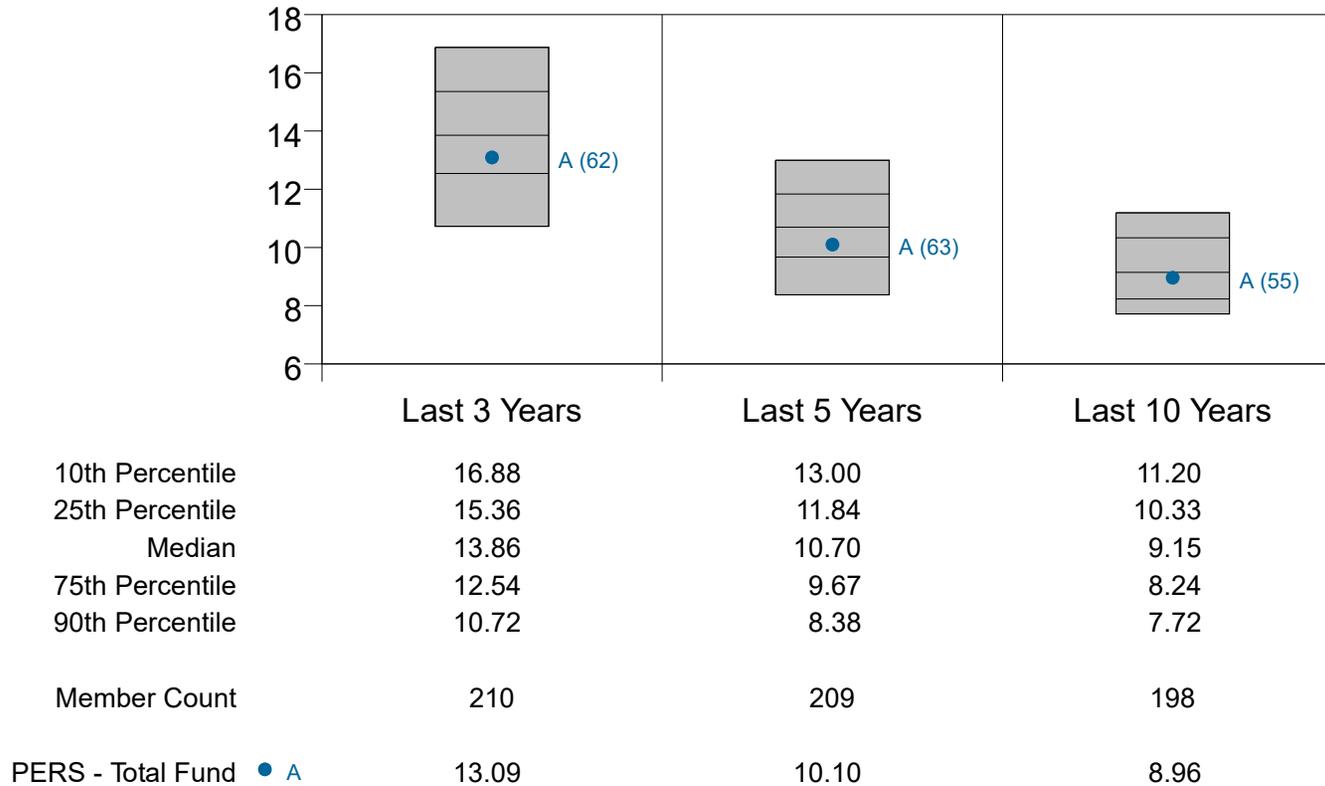
PERS - Total Fund ● A	(11.90)	(11.90)	(11.90)	(11.90)
-----------------------	---------	---------	---------	---------

- “Maximum drawdown” is a measure of the largest loss from peak to trough in a given period.
- Lower rankings reflect larger drawdowns (i.e. bigger losses). ARMB’s drawdown rankings for all periods have reflected better than average drawdowns (i.e. lower losses) and have improved over time.
- The drawdown experienced in the first quarter of 2020 is the largest of the last 10 years.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

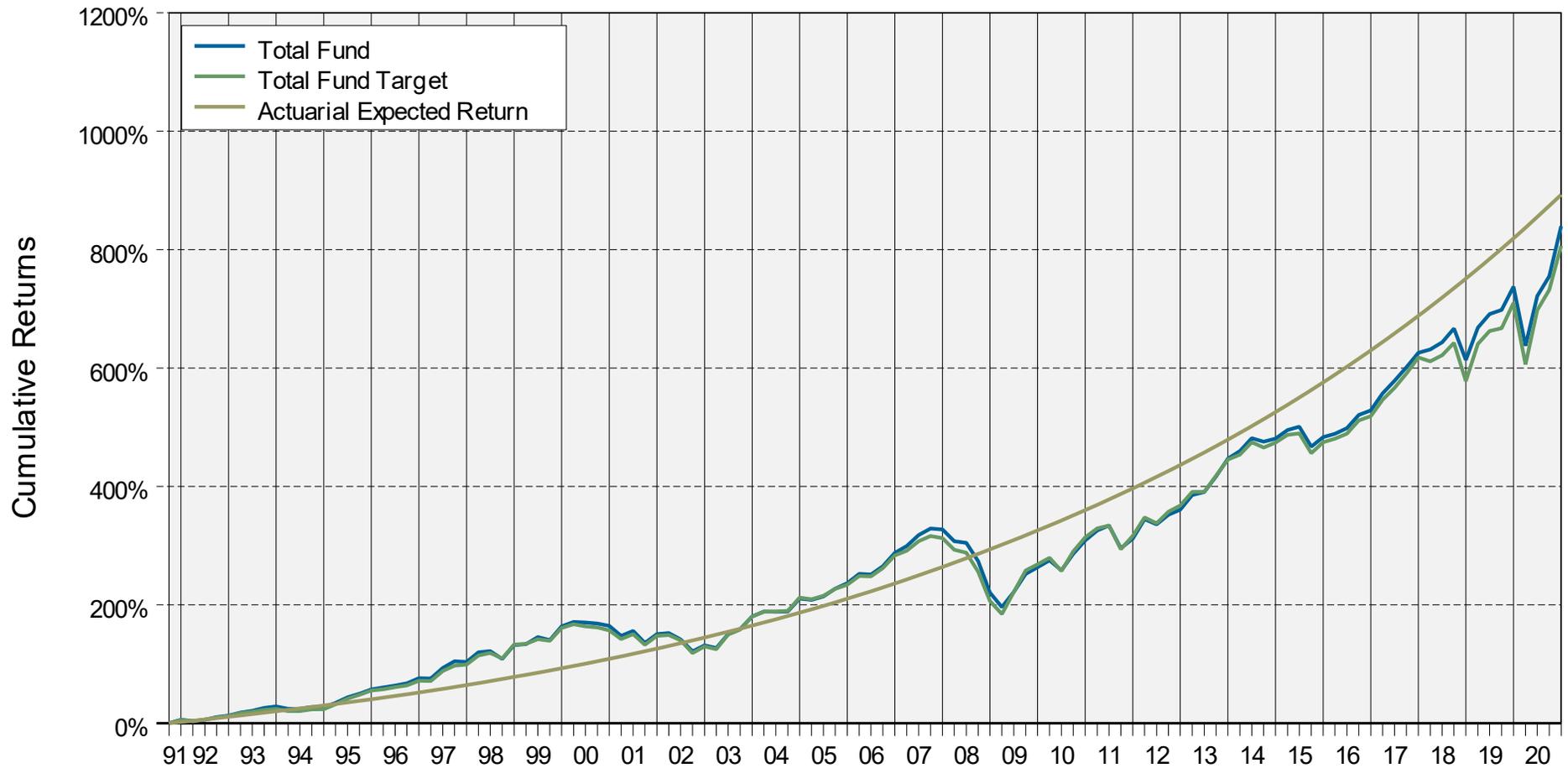
Gross of Fee Standard Deviation
for Periods Ended December 31, 2020
Group: Callan Public Fund Sponsor Database



- “Standard deviation” measures variability of returns. It is one measurement of investment risk.
- Less standard deviation results in lower rankings. A lower ranking of standard deviation suggests lower variability.
- ARMB’s portfolio diversification has resulted in volatility that is lower than median compared to peers.

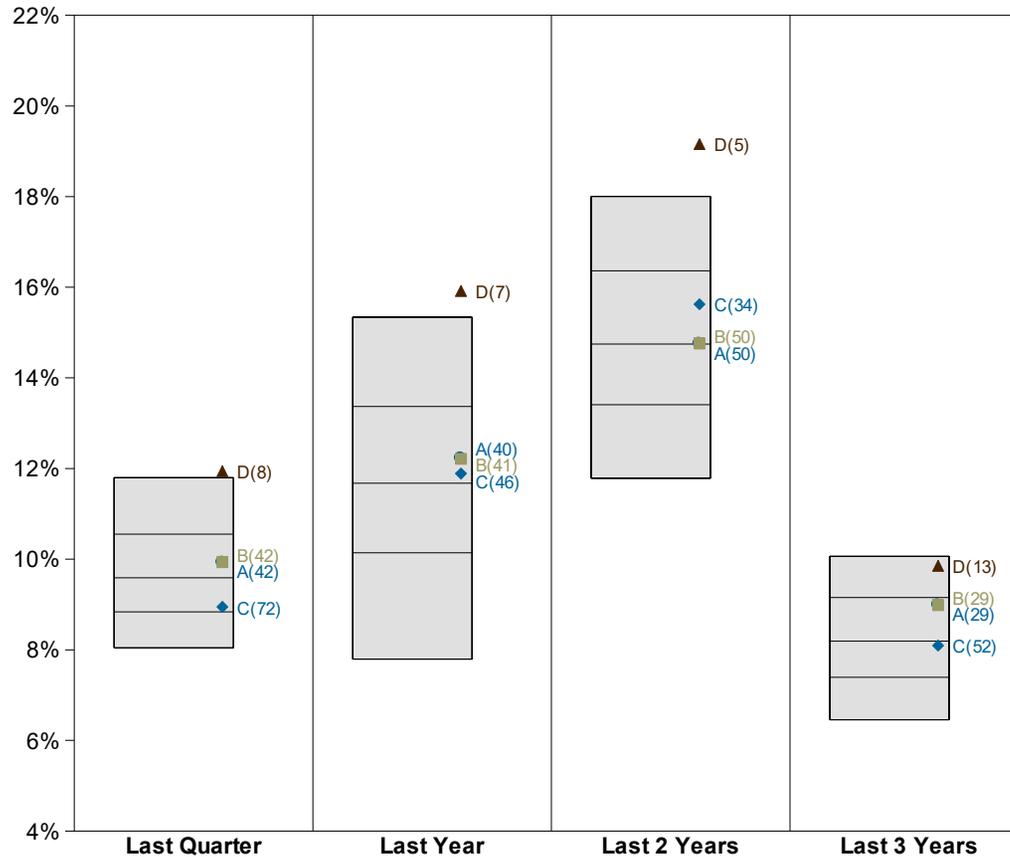
PERS Long-Term Total Fund Performance as of 12/31/20

Cumulative Returns Actual vs Target



- Each Fund has two targets: the asset allocation policy return and the actuarial return.
- Total Fund returns continue to closely track the strategic allocation target.
- Market correction setbacks in 3Q15, 4Q18, and 1Q20 have hindered the Total Fund's progress toward closing the gap versus the actuarial return following the Global Financial Crisis of 2008/2009.

Annualized Total Fund Returns as of 12/31/20

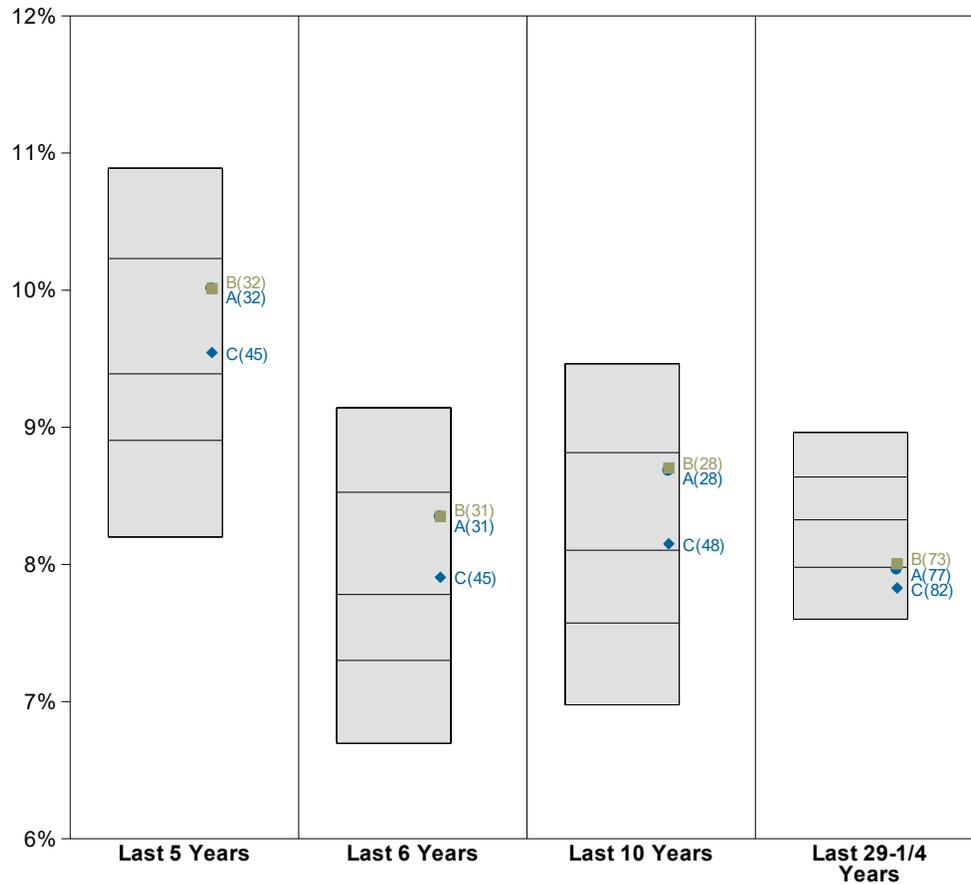


- PERS and TRS have outperformed their target for the last quarter, one-year, and three-year periods, but underperformed over the last two-year period.

	Last Quarter	Last Year	Last 2 Years	Last 3 Years
10th Percentile	11.80	15.34	18.01	10.06
25th Percentile	10.55	13.37	16.36	9.15
Median	9.59	11.68	14.74	8.19
75th Percentile	8.84	10.14	13.41	7.39
90th Percentile	8.04	7.80	11.79	6.46
PERS Total Plan ● A	9.93	12.23	14.75	8.99
TRS Total Plan ■ B	9.94	12.21	14.76	8.99
Target Index ◆ C	8.95	11.89	15.62	8.09
Public Market Proxy ▲ D	11.94	15.92	19.16	9.85

The Public Market Proxy consists of 45% Russell 3000 Index, 30% MSCI ACWI ex US IMI (Net), and 25% Bloomberg Aggregate Index.

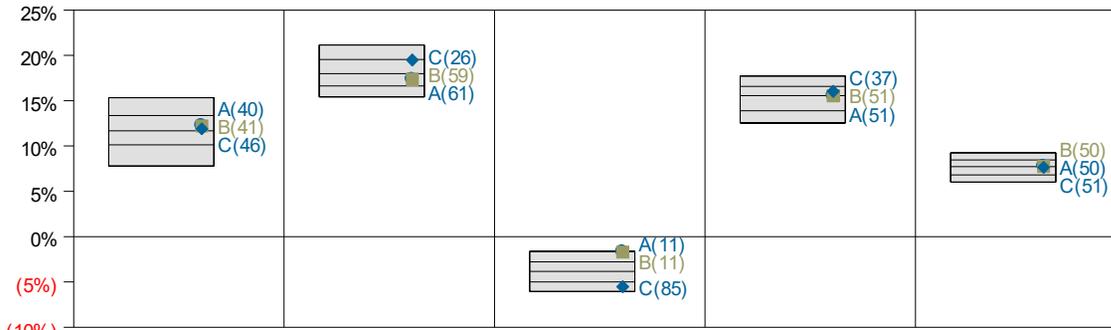
Longer-Term Total Fund Returns as of 12/31/20



- Five-, six-, and ten-year performance is above target and median.
- 29 year and 1 quarter return for PERS beat the target by 13 basis points.

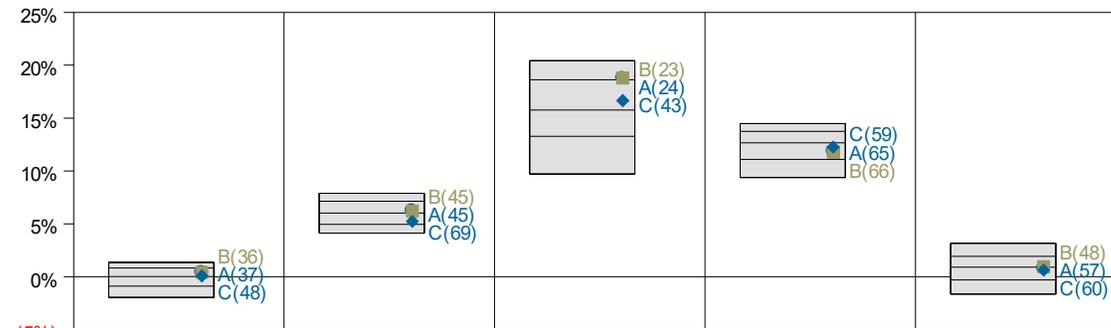
10th Percentile	10.89	9.14	9.46	8.96
25th Percentile	10.23	8.53	8.81	8.64
Median	9.39	7.78	8.10	8.33
75th Percentile	8.91	7.30	7.57	7.98
90th Percentile	8.20	6.70	6.98	7.60
PERS Total Plan ● A	10.01	8.35	8.68	7.96
TRS Total Plan ■ B	10.01	8.35	8.70	8.01
Target Index ◆ C	9.54	7.91	8.15	7.83

Calendar Period Total Fund Performance



	2020	2019	2018	2017	2016
10th Percentile	15.34	21.16	(1.63)	17.73	9.24
25th Percentile	13.37	19.55	(2.78)	16.59	8.46
Median	11.68	17.98	(3.82)	15.55	7.73
75th Percentile	10.14	16.62	(4.99)	13.89	6.82
90th Percentile	7.80	15.42	(6.05)	12.54	6.01

PERS Total Plan	● A	12.23	17.34	(1.70)	15.52	7.74
TRS Total Plan	■ B	12.21	17.36	(1.70)	15.54	7.74
Target Index	◆ C	11.89	19.49	(5.53)	16.03	7.64



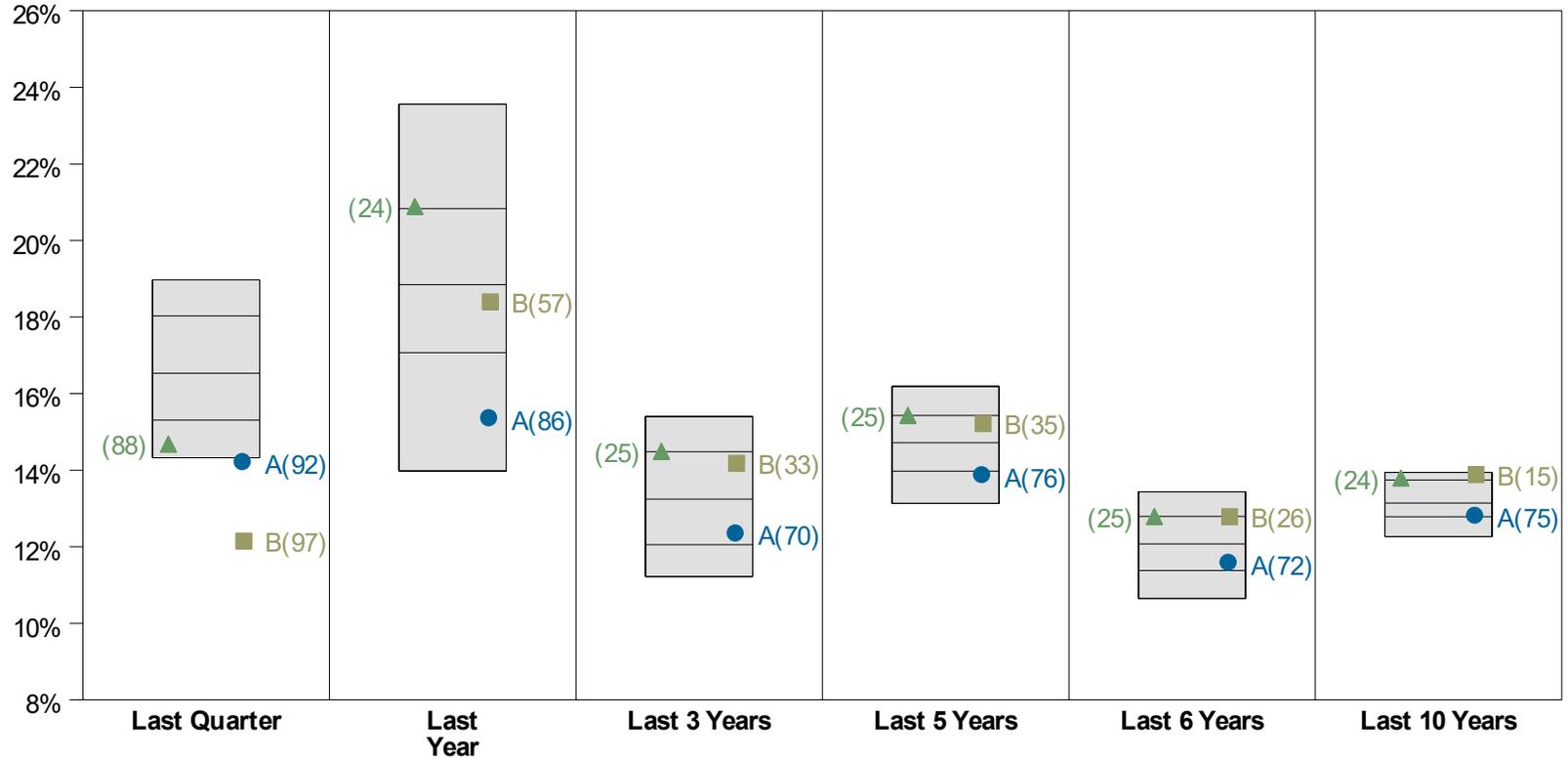
	2015	2014	2013	2012	2011
10th Percentile	1.36	7.89	20.43	14.50	3.17
25th Percentile	0.83	7.14	18.62	13.74	1.92
Median	0.02	6.03	15.77	12.66	0.91
75th Percentile	(0.88)	4.96	13.28	11.11	(0.30)
90th Percentile	(1.95)	4.13	9.71	9.38	(1.63)

PERS Total Plan	● A	0.40	6.22	18.74	11.81	0.77
TRS Total Plan	■ B	0.41	6.22	18.79	11.79	0.95
Target Index	◆ C	0.08	5.24	16.66	12.26	0.62

- PERS ranks above median in six and TRS ranks above median in seven of the 10 periods shown.
- Peer group range of returns during 2016, 2015, and 2014 were very tight.
- Wide range of peer group returns during calendar 2013 due to varying fixed-income allocations within the Public Fund universe.

Total Domestic Equity through 12/31/20

Performance vs Public Fund - Domestic Equity (Gross)



10th Percentile	18.97	23.56	15.40	16.19	13.43	13.94	
25th Percentile	18.03	20.83	14.48	15.43	12.80	13.74	
Median	16.53	18.84	13.24	14.72	12.07	13.14	
75th Percentile	15.31	17.07	12.05	13.97	11.38	12.78	
90th Percentile	14.33	13.98	11.22	13.13	10.65	12.27	
Domestic Equity Pool	● A	14.18	15.32	12.32	13.84	11.55	12.78
Standard & Poor's 500	■ B	12.15	18.40	14.18	15.22	12.79	13.88
Russell 3000 Index	▲	14.68	20.89	14.49	15.43	12.79	13.79

Domestic Equity Component Returns

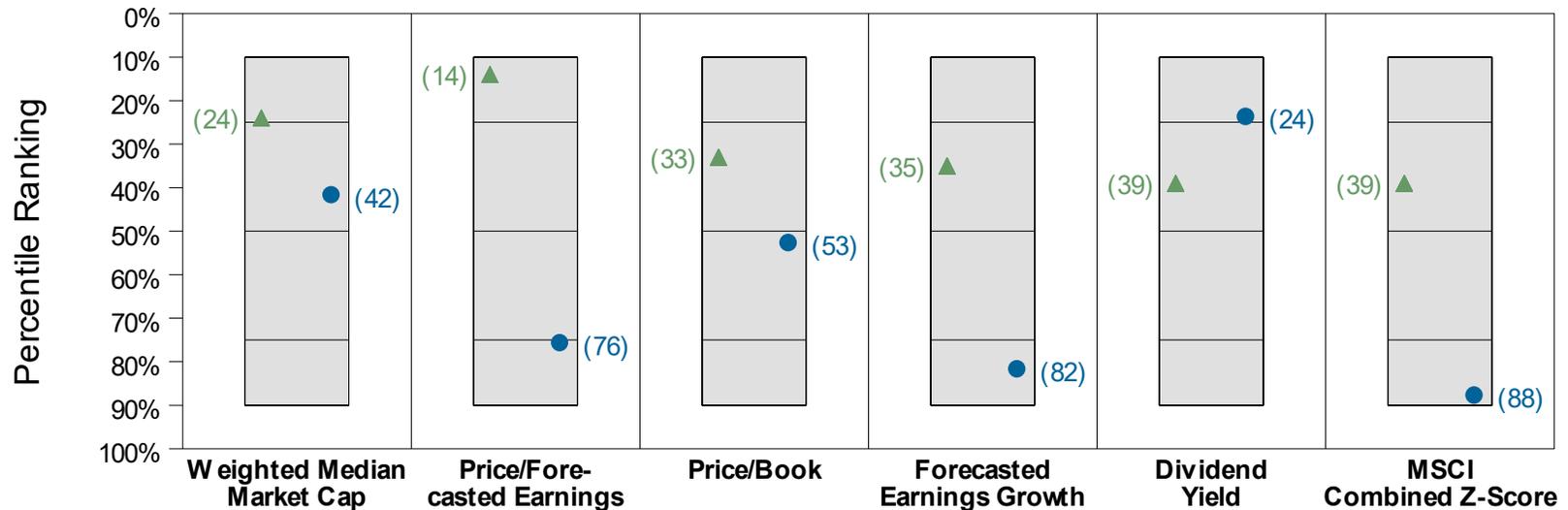
Returns for Periods Ended December 31, 2020

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Total Dom Equity Pool	14.18%	15.32%	12.32%	13.84%	12.78%
Russell 3000 Index	14.68%	20.89%	14.49%	15.43%	13.79%
Large Cap Managers	12.75%	15.61%	12.73%	14.11%	13.24%
Russell 1000 Index	13.69%	20.96%	14.82%	15.60%	14.01%
Small Cap Managers	31.01%	10.80%	8.71%	12.39%	11.24%
Russell 2000 Index	31.37%	19.96%	10.25%	13.26%	11.20%

- The large cap composite trailed its benchmark (the Russell 1000 Index) over all periods shown in the table.
- The small cap composite has also trailed its benchmark (the Russell 2000 Index) over most of the periods shown, the exception being outperformance over the trailing 10-year period.

Domestic Equity Portfolio Characteristics

Portfolio Characteristics Percentile Rankings Rankings Against Public Fund - Domestic Equity as of December 31, 2020

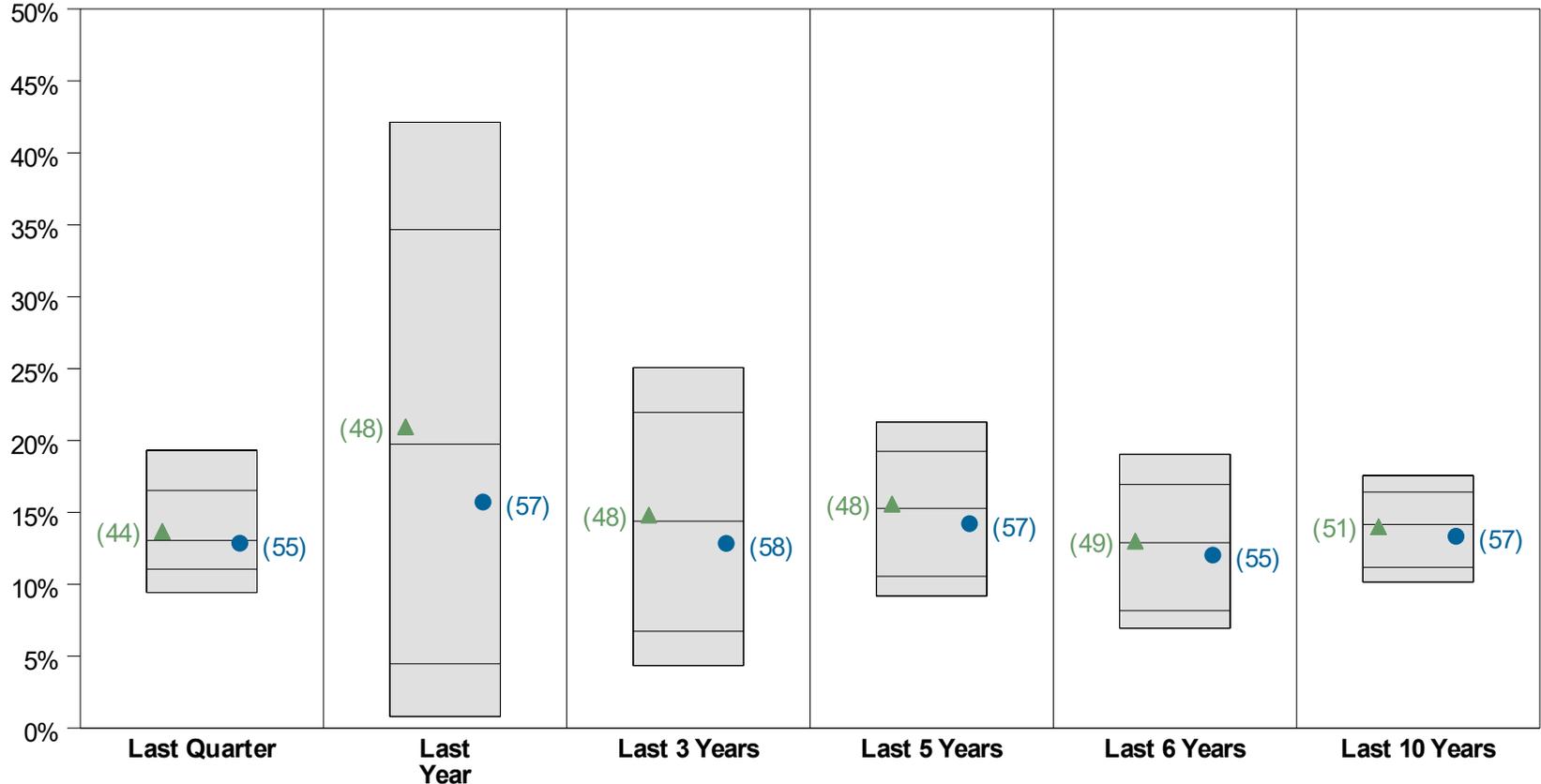


10th Percentile	167.10	24.44	3.88	14.13	1.54	0.14
25th Percentile	99.53	23.47	3.84	13.44	1.49	0.07
Median	68.71	22.49	3.48	12.33	1.36	(0.01)
75th Percentile	45.31	22.04	3.15	12.12	1.22	(0.07)
90th Percentile	31.68	20.89	2.66	11.08	1.09	(0.22)
Domestic EquityPool	● 77.23	21.98	3.46	11.92	1.50	(0.12)
Russell 3000 Index	▲ 110.64	24.01	3.69	13.01	1.41	0.01

- ARMB's overall domestic equity portfolio's market capitalization is smaller than 42% of public funds (first column).
- Overall, ARMB's domestic equity portfolio tilts decidedly "value" versus peers (last column on right).
 - "MSCI Combined Z-Score" measures Growth and Value characteristics of individual stocks within managers' portfolios.
 - A low Z-Score rank (i.e.– the dot appears towards the top of the floating bar) indicates a Growth bias.
 - A high Z-Score rank (i.e. – the dot appears towards the bottom of the floating bar) indicates a Value bias.

Large Cap Domestic Equity through 12/31/20

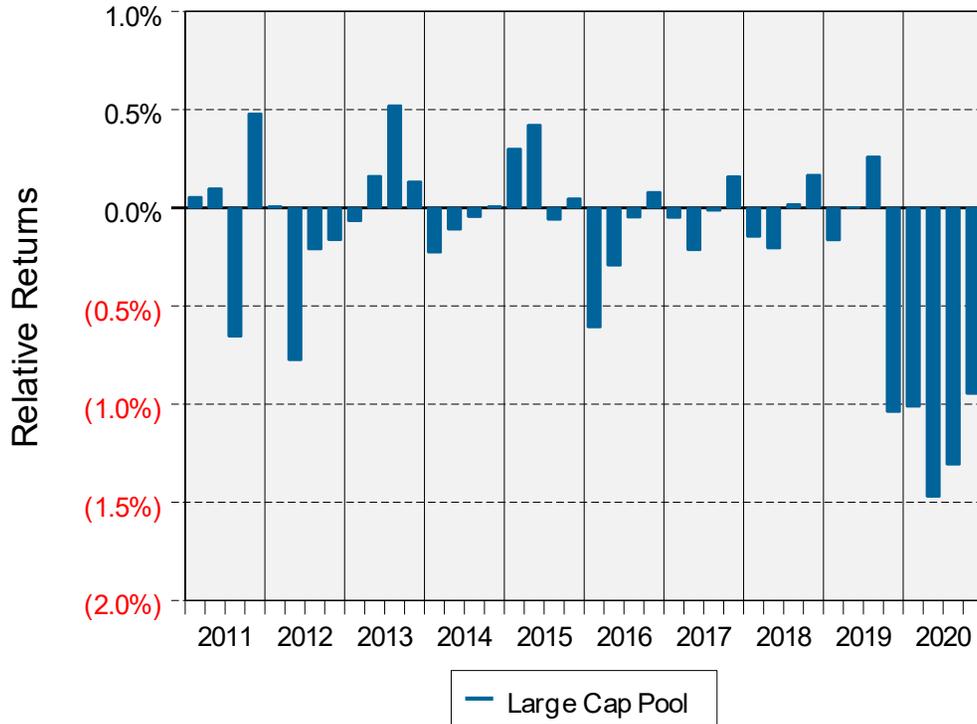
Performance vs Callan Large Capitalization (Gross)



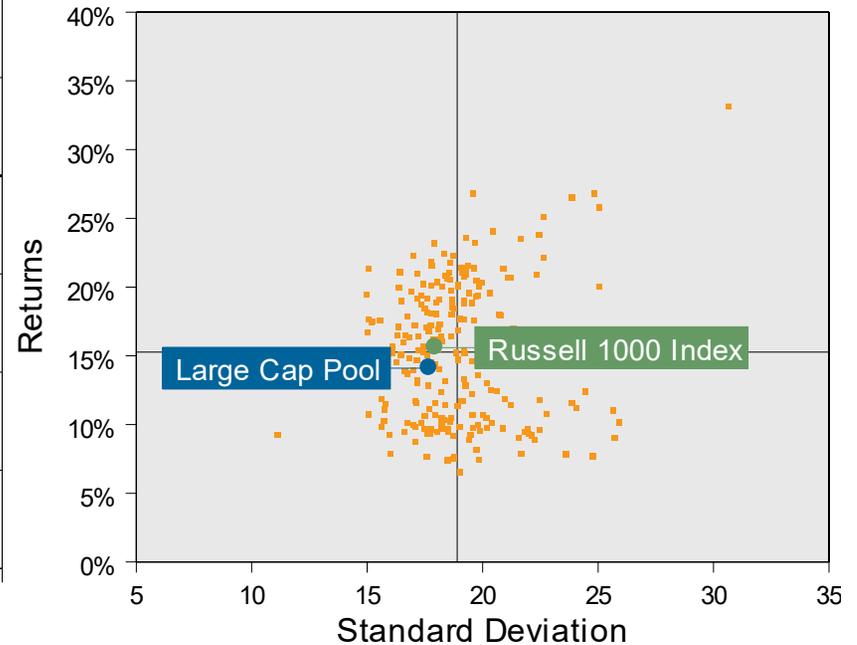
10th Percentile	19.33	42.13	25.08	21.29	19.04	17.57
25th Percentile	16.53	34.66	21.96	19.25	16.95	16.41
Median	13.06	19.74	14.39	15.28	12.90	14.16
75th Percentile	11.06	4.48	6.75	10.56	8.18	11.19
90th Percentile	9.43	0.82	4.35	9.19	6.95	10.16
Large Cap Pool ●	12.75	15.61	12.73	14.11	11.92	13.24
Russell 1000 Index ▲	13.69	20.96	14.82	15.60	13.01	14.01

Large Cap Domestic Equity as of 12/31/20

Relative Return vs Russell 1000 Index



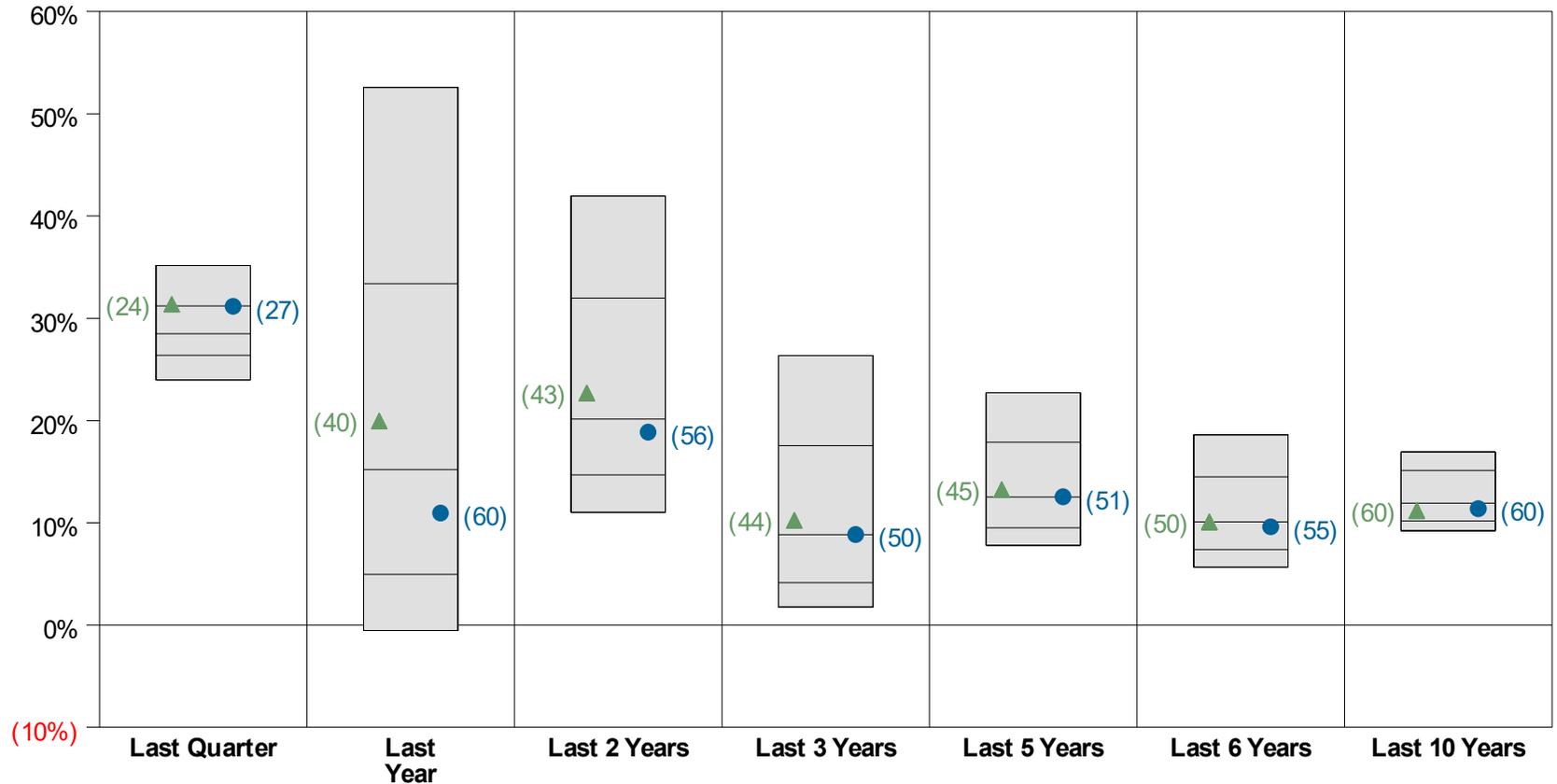
Callan Large Capitalization (Gross) Annualized Five Year Risk vs Return



- Long-term performance exhibits market-like returns with similar risk.
- In the last five quarters, underperformance vs. the Russell 1000 Index was driven by Scientific Beta, which trailed the broad benchmark by between 2% and 4% in each of those quarters.
- In the last three quarters, passive implementation also detracted as the S&P 900 Index trailed the Russell 1000 Index by 1.1% in 2Q20, 0.8% in 3Q20, and 0.9% in 4Q20.

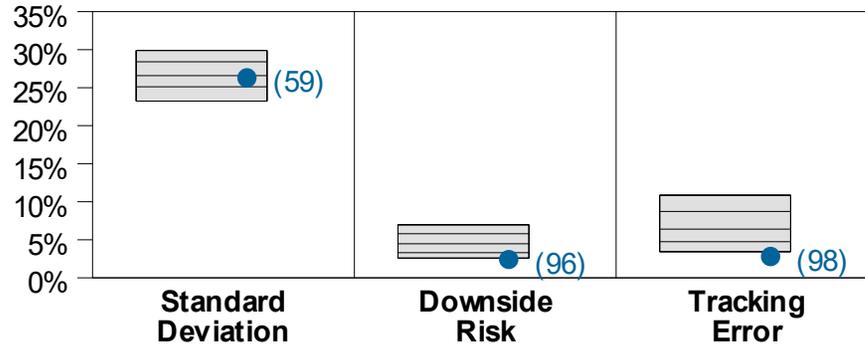
Small Cap Domestic Equity through 12/31/20

Performance vs Callan Small Capitalization (Gross)



10th Percentile	35.17	52.59	41.97	26.34	22.72	18.61	16.93
25th Percentile	31.21	33.38	31.97	17.55	17.88	14.49	15.11
Median	28.49	15.20	20.14	8.84	12.51	10.10	11.93
75th Percentile	26.39	4.97	14.69	4.14	9.51	7.39	10.18
90th Percentile	23.97	(0.54)	11.02	1.76	7.80	5.66	9.21
Small Cap Pool ●	31.01	10.80	18.71	8.71	12.39	9.45	11.24
Russell 2000 Index ▲	31.37	19.96	22.71	10.25	13.26	10.10	11.20

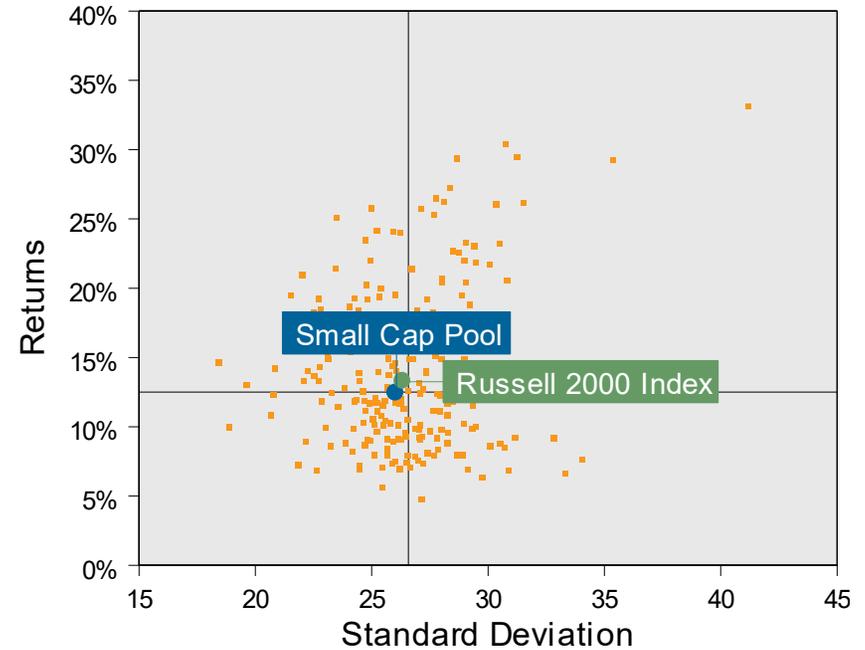
Small Cap Domestic Equity through 12/31/20



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	29.89	6.96	10.85
25th Percentile	28.40	5.80	8.75
Median	26.58	4.47	6.41
75th Percentile	25.11	3.34	4.75
90th Percentile	23.25	2.62	3.45

Small Cap EquityPool	Standard Deviation	Downside Risk	Tracking Error
●	26.07	2.18	2.58

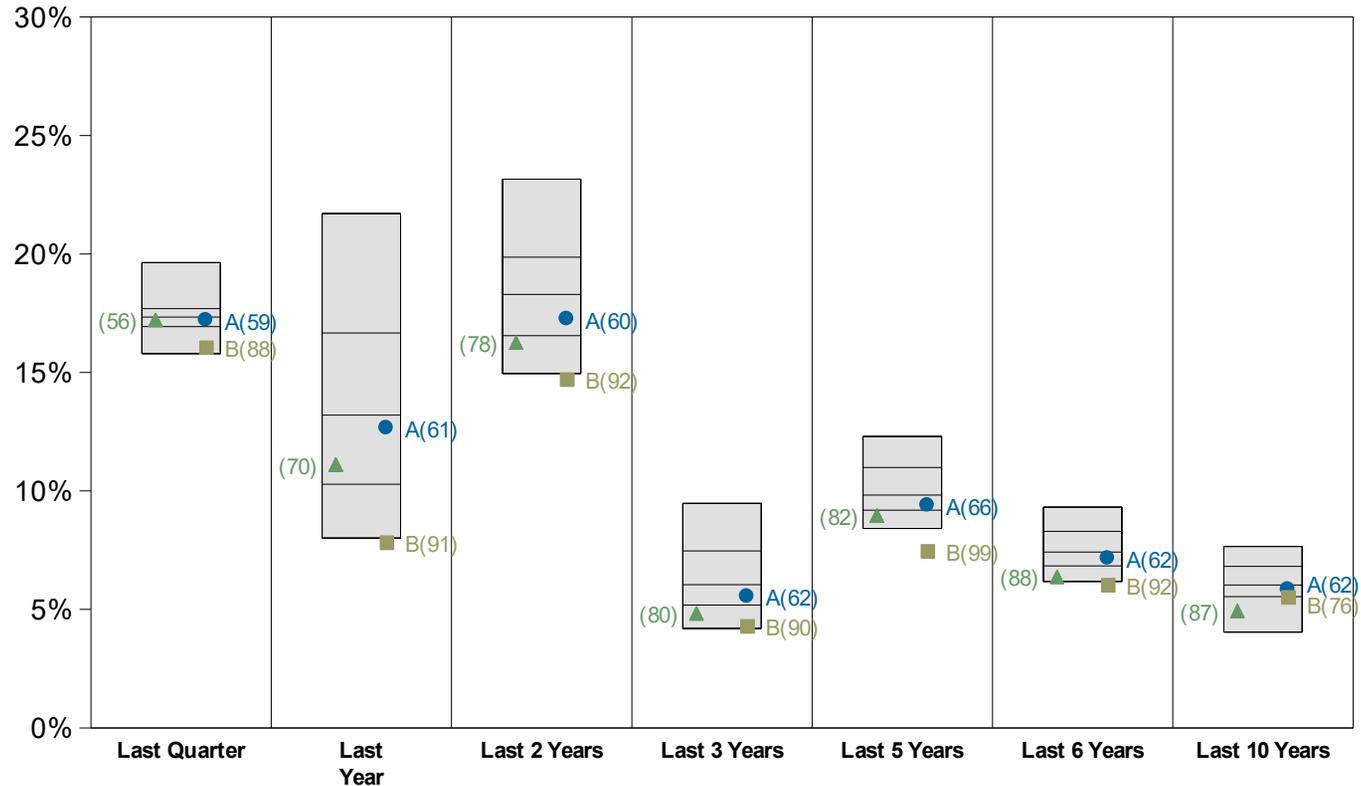
Callan Small Capitalization (Gross)
Annualized Five Year Risk vs Return



- The five-year risk statistics of standard deviation, downside risk, and tracking error compare favorably versus the peer group of small cap managers.

Global Equity ex-US through 12/31/20

Performance vs Public Fund - International Equity (Gross)

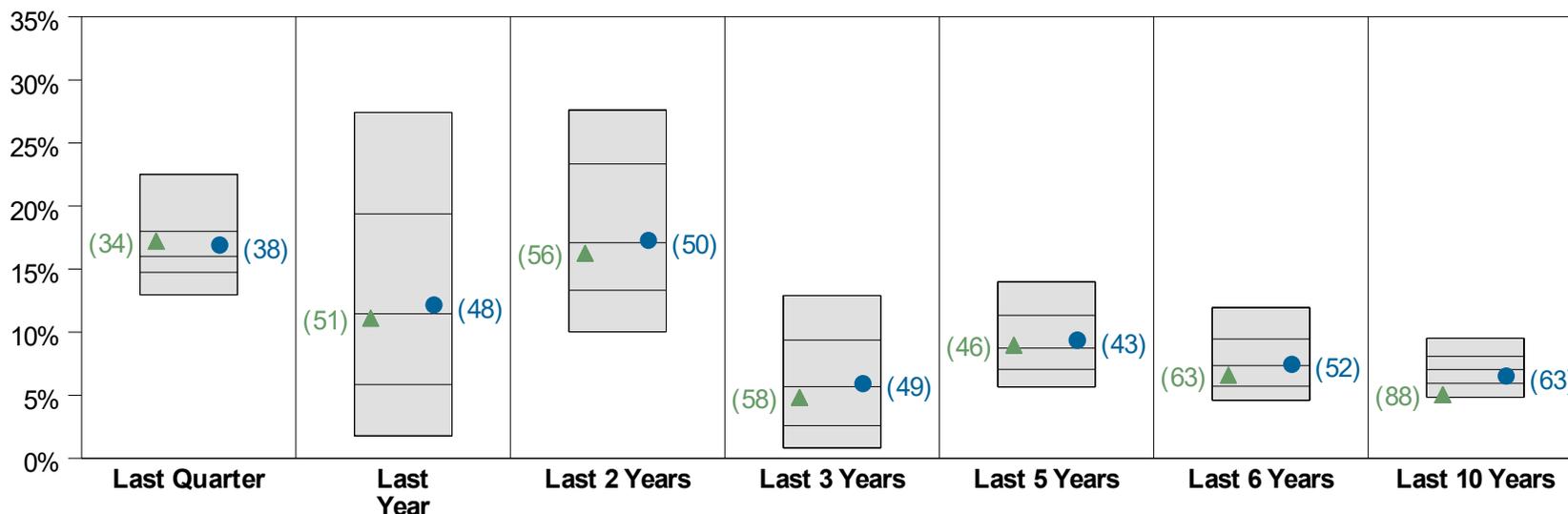


	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	19.64	21.71	23.16	9.47	12.30	9.31	7.66
25th Percentile	17.70	16.67	19.87	7.47	10.99	8.30	6.82
Median	17.34	13.20	18.29	6.05	9.83	7.43	6.03
75th Percentile	16.93	10.28	16.55	5.18	9.19	6.84	5.54
90th Percentile	15.79	8.02	14.95	4.20	8.42	6.18	4.04
Global Equity ex-US MSCI	● A 17.19	12.64	17.24	5.54	9.38	7.15	5.82
EAFE Index	■ B 16.05	7.82	14.70	4.28	7.45	6.03	5.51
Int'l Equity Target	▲ 17.22	11.12	16.26	4.83	8.96	6.38	4.94

The Int'l Equity Target currently consists of MSCI ACWI ex U.S. IMI.

International Equity ex Emerging Markets through 12/31/20

Performance vs Callan Non-US Equity (Gross)



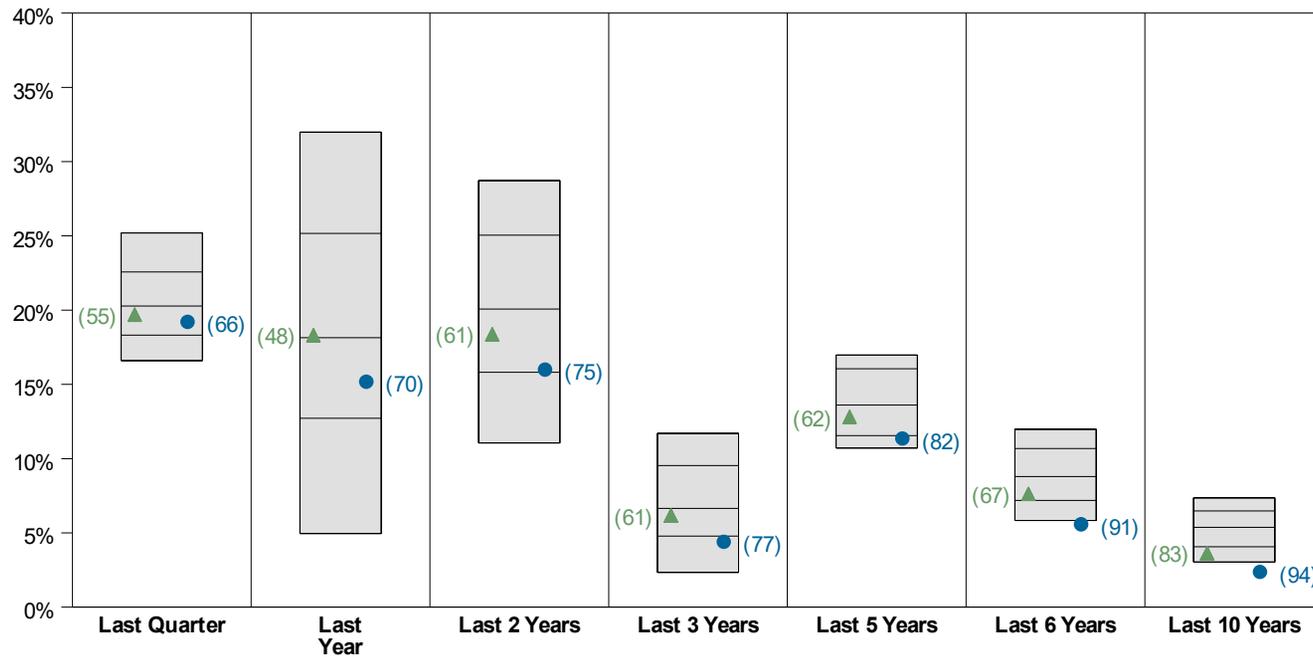
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	22.50	27.42	27.61	12.91	14.00	11.95	9.52
25th Percentile	17.98	19.38	23.34	9.37	11.34	9.46	8.09
Median	16.00	11.45	17.09	5.69	8.74	7.35	7.05
75th Percentile	14.74	5.85	13.32	2.58	7.05	5.72	5.94
90th Percentile	12.96	1.78	10.03	0.82	5.65	4.60	4.84
Int'l Equity Pool (ex Emerging. Mkt)	● 16.77	12.02	17.14	5.80	9.23	7.31	6.38
MSCI ACWI ex US IMI	▲ 17.22	11.12	16.26	4.83	8.98	6.59	5.06

International Equity ex Emerging Markets through 12/31/20

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	16.77%	12.02%	5.80%	9.23%	6.38%
Arrowstreet ACWI ex -US	21.78%	22.73%	9.71%	12.42%	-
Baillie Gifford ACWI ex US	17.01%	33.87%	14.58%	15.06%	-
Brandes Investment	21.80%	0.43%	1.36%	4.90%	5.02%
Capital Guardian	14.99%	22.05%	13.03%	14.54%	8.96%
L&G Sci Beta Dev ex US	14.17%	4.95%	-	-	-
SSgA World ex US IMI	16.17%	8.40%	-	-	-
MSCI EAFE Index	16.05%	7.82%	4.28%	7.45%	5.51%
MSCI ACWI ex-US IMI Index	17.22%	11.12%	4.83%	8.98%	5.06%

Emerging Markets through 12/31/20

Performance vs Callan Emerging Broad (Gross)



10th Percentile	25.20	31.99	28.73	11.70	16.97	11.99	7.35
25th Percentile	22.57	25.16	25.04	9.53	16.05	10.68	6.47
Median	20.27	18.14	20.07	6.65	13.60	8.79	5.37
75th Percentile	18.32	12.72	15.81	4.79	11.54	7.18	4.07
90th Percentile	16.59	4.96	11.05	2.33	10.71	5.83	3.04
Emerging Markets Pool	● 19.13	15.09	15.91	4.30	11.27	5.49	2.28
MSCI EM	▲ 19.70	18.31	18.37	6.18	12.81	7.63	3.63

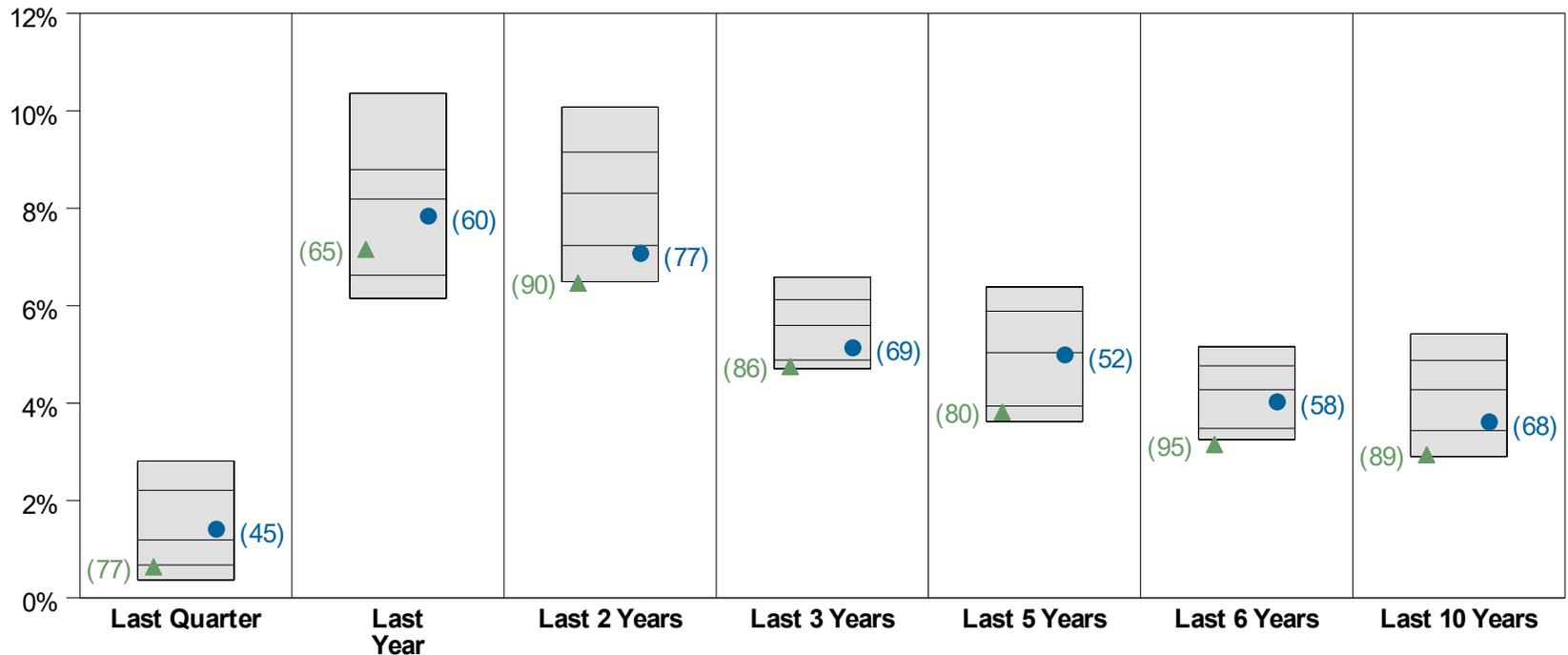
- After underperforming by 3.76% in 2Q17, 1.38% in 3Q17, 1.68% in 4Q17, 4.03% in 2Q18, 1.87% in 1Q19, and 1.41% in 4Q19, the Emerging Markets Pool lags the benchmark and ranks in the bottom quartile over periods of three years and longer.
- DRZ and Lazard were liquidated and L&G Scientific Beta was funded in 4Q19, leaving only passive and smart beta approaches within the emerging markets equity space.

Emerging Markets Pool through 12/31/20

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	19.13%	15.09%	4.30%	11.27%	2.28%
SSgA Emerging Markets	19.41%	18.15%	-	-	-
L&G SciBeta EM	18.39%	6.61%	-	-	-
MSCI EM	19.70%	18.31%	6.18%	12.81%	3.63%

Total Fixed Income as of 12/31/20

Performance vs Public Fund - Domestic Fixed (Gross)



10th Percentile	2.81	10.36	10.08	6.59	6.39	5.16	5.42	
25th Percentile	2.21	8.79	9.15	6.13	5.89	4.76	4.88	
Median	1.19	8.19	8.31	5.59	5.04	4.27	4.28	
75th Percentile	0.68	6.63	7.24	4.88	3.94	3.48	3.44	
90th Percentile	0.37	6.15	6.49	4.71	3.62	3.25	2.90	
Total Fixed Income Pool	●	1.38	7.80	7.04	5.10	4.95	3.99	3.58
Fixed Income Target	▲	0.64	7.16	6.46	4.75	3.82	3.15	2.94

- The transition from intermediate Treasury to Aggregate mandates was completed during the fourth quarter of 2019.

Includes In-House and External Portfolios

Total Fixed Income through 12/31/20

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Fixed Income	1.38%	7.80%	5.10%	4.95%	3.58%
Fixed Income Target	0.64%	7.16%	4.75%	3.82%	2.94%
Blmbg Treasury Intmtd	(0.23%)	5.77%	4.12%	2.90%	2.50%
ARMB US Aggregate	0.83%	9.10%	-	-	-
Opportunistic Fixed Income	4.22%	3.05%	5.62%	7.10%	6.64%
FIAM Tactical Bond	4.42%	8.96%	7.15%	7.65%	-
Blmbg Aggregate	0.67%	7.51%	5.34%	4.44%	3.84%
FIAM REHI	4.57%	(4.97%)	2.97%	3.70%	-
Blmbg:Universal CMBS xAaa	4.42%	4.13%	5.46%	5.40%	5.47%
Alternative Fixed Income	1.22%	2.85%	-	-	-
Crestline (Blue Glacier)	1.02%	2.59%	4.22%	6.14%	6.07%
Prisma Capital (Polar Bear)	0.46%	(0.50%)	1.53%	1.55%	3.02%
Crestline Specialty Lending Fund	7.30%	14.52%	14.55%	13.77%	-
Crestline Specialty Lndg Fd II	4.36%	9.12%	6.81%	-	-
HFRI Fund of Funds Index	8.05%	10.82%	4.86%	4.54%	3.32%
T-Bills + 5%	1.26%	5.67%	6.61%	6.20%	5.64%

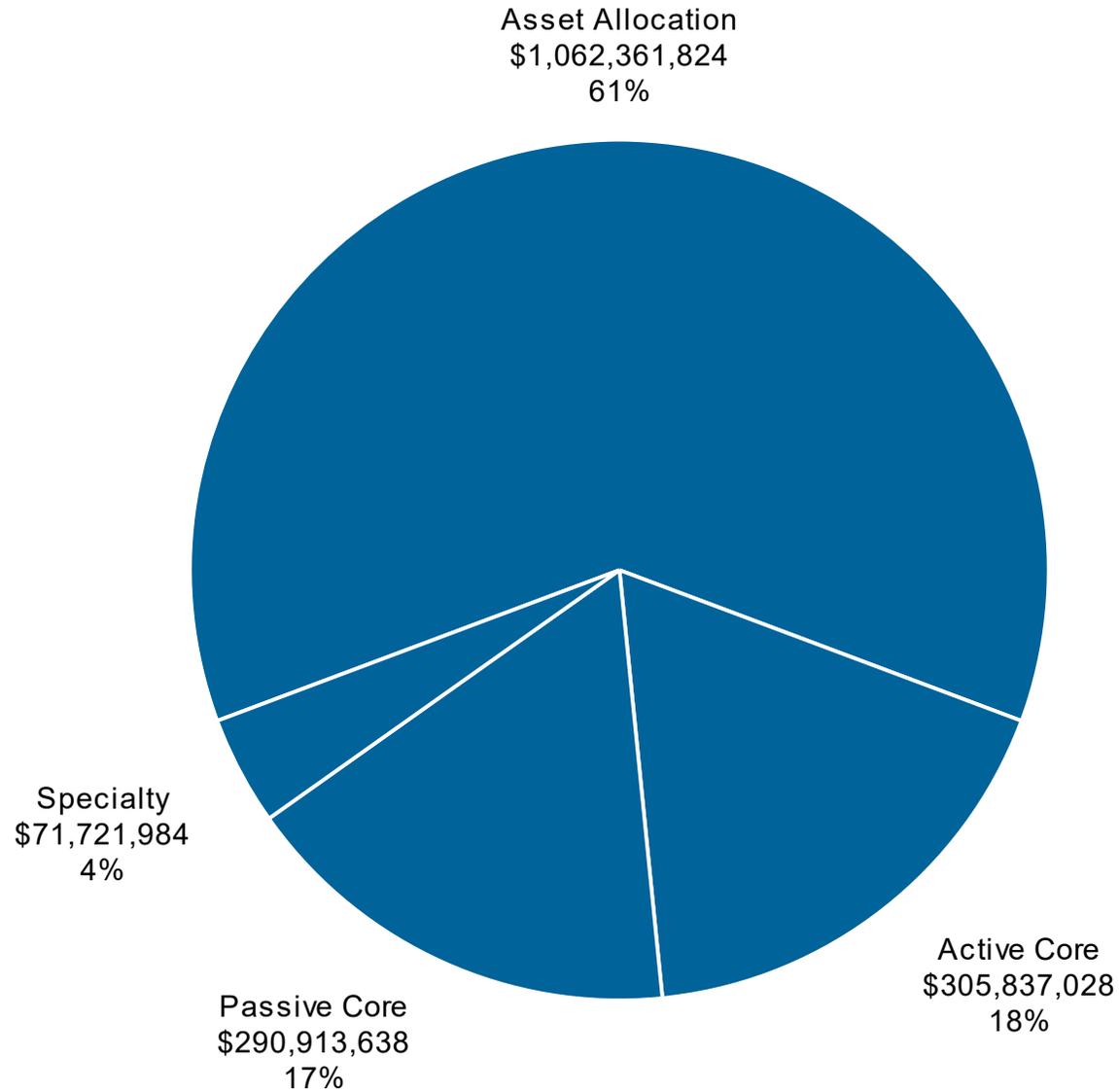
Opportunistic through 12/31/20

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Opportunistic (T)	8.38%	10.68%	7.81%	-	-
Alternative Equity Strategies	12.59%	33.79%	15.58%	13.78%	10.56%
McKinley Healthcare Transformation	12.59%	33.79%	-	-	-
Russell 1000 Index	13.69%	20.96%	14.82%	15.60%	14.01%
Other Opportunities	2.20%	3.43%	1.81%	3.52%	-
Project Pearl	0.00%	(5.79%)	-	-	-
Schroders Insurance Linked	3.29%	6.26%	1.01%	-	-
T-Bills + 6%	1.50%	6.67%	7.61%	7.20%	6.64%
Tactical Allocation Strategies	12.03%	13.78%	-	-	-
PineBridge	13.98%	13.64%	-	-	-
Pine Bridge Benchmark	11.46%	10.92%	5.25%	7.50%	4.11%
Fidelity Signals	10.15%	13.92%	-	-	-
Fidelity Signals Benchmark	9.62%	13.56%	8.41%	9.33%	7.24%
Alternative Beta	(6.22%)	(18.01%)	(8.67%)	-	-
Man Group Alternative Risk Premia	(6.22%)	(12.37%)	(4.10%)	-	-
T-Bills + 5%	1.26%	5.67%	6.61%	6.20%	5.64%

Participant-Directed Plans

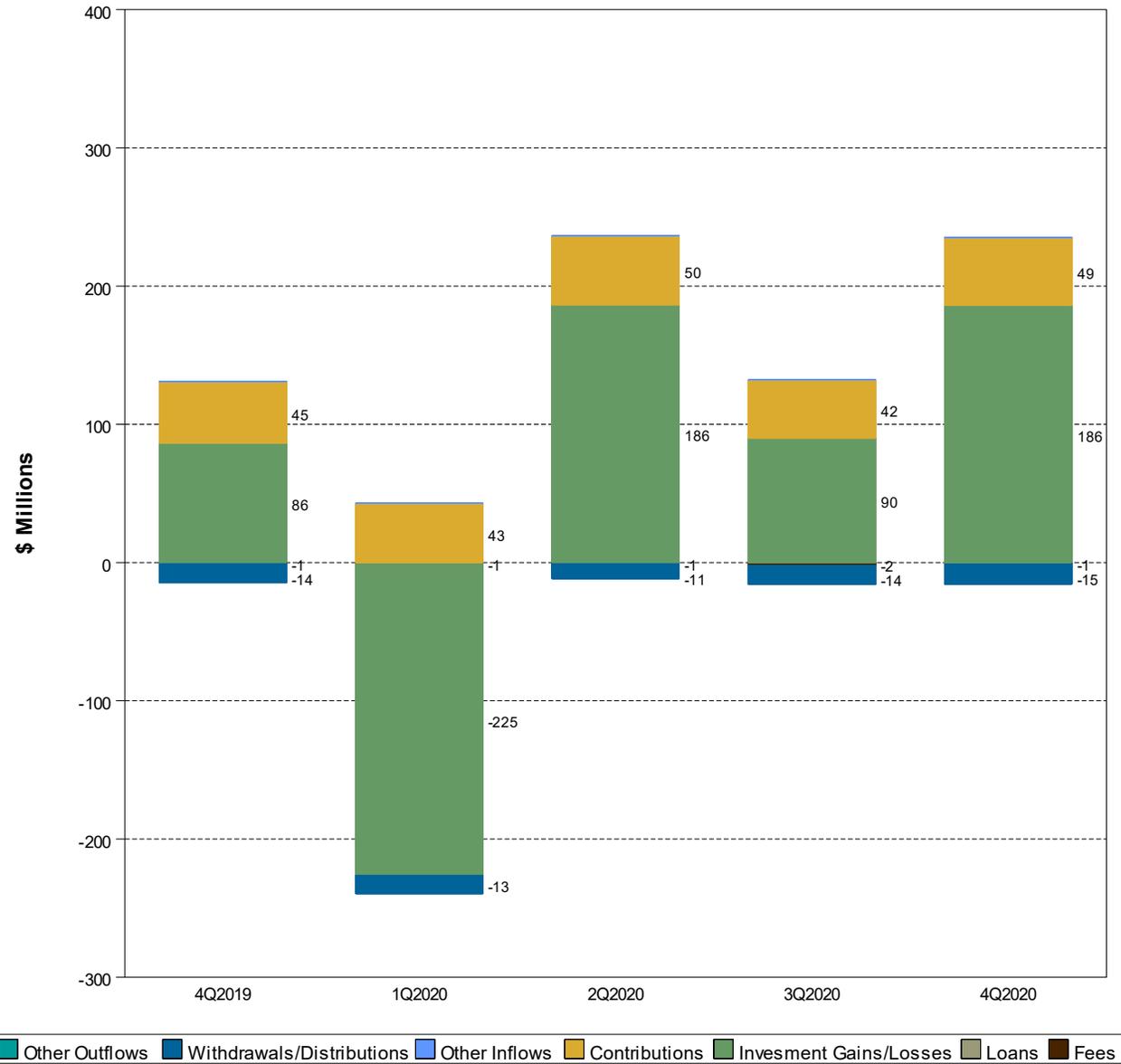
PERS DC Plan

December 31, 2020



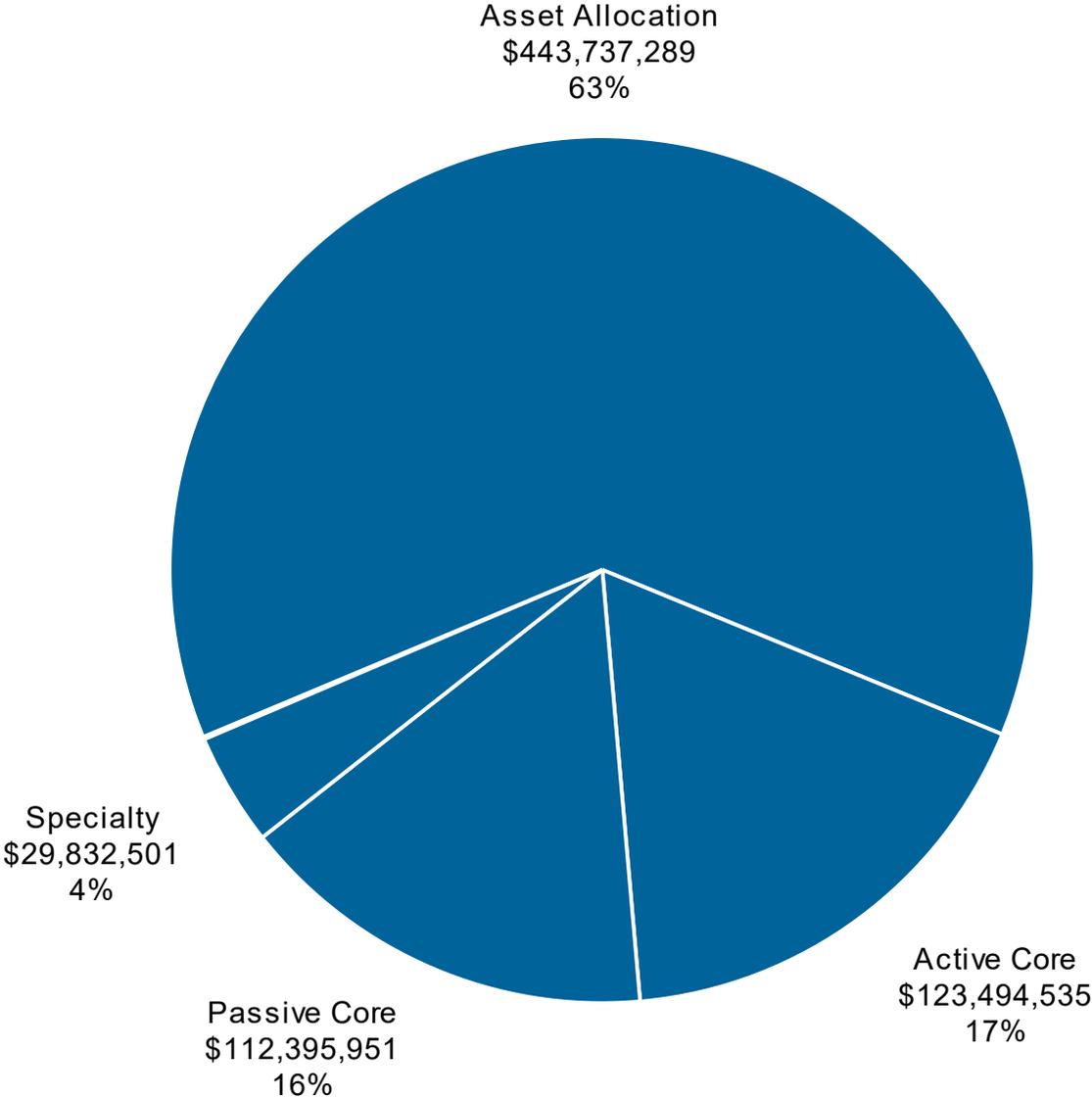
PERS DC Plan: Asset Changes

December 31, 2020



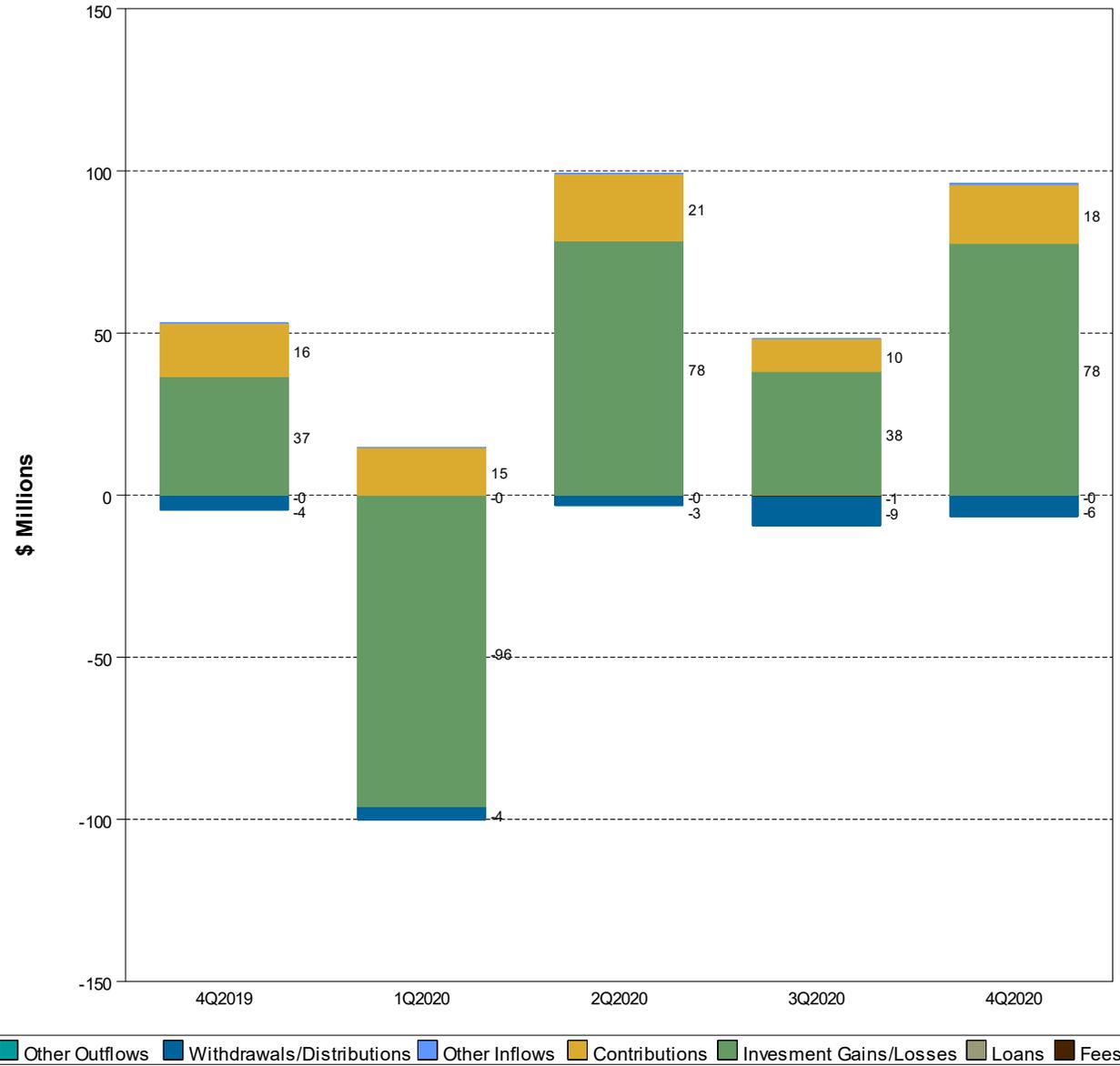
TRS DC Plan

December 31, 2020



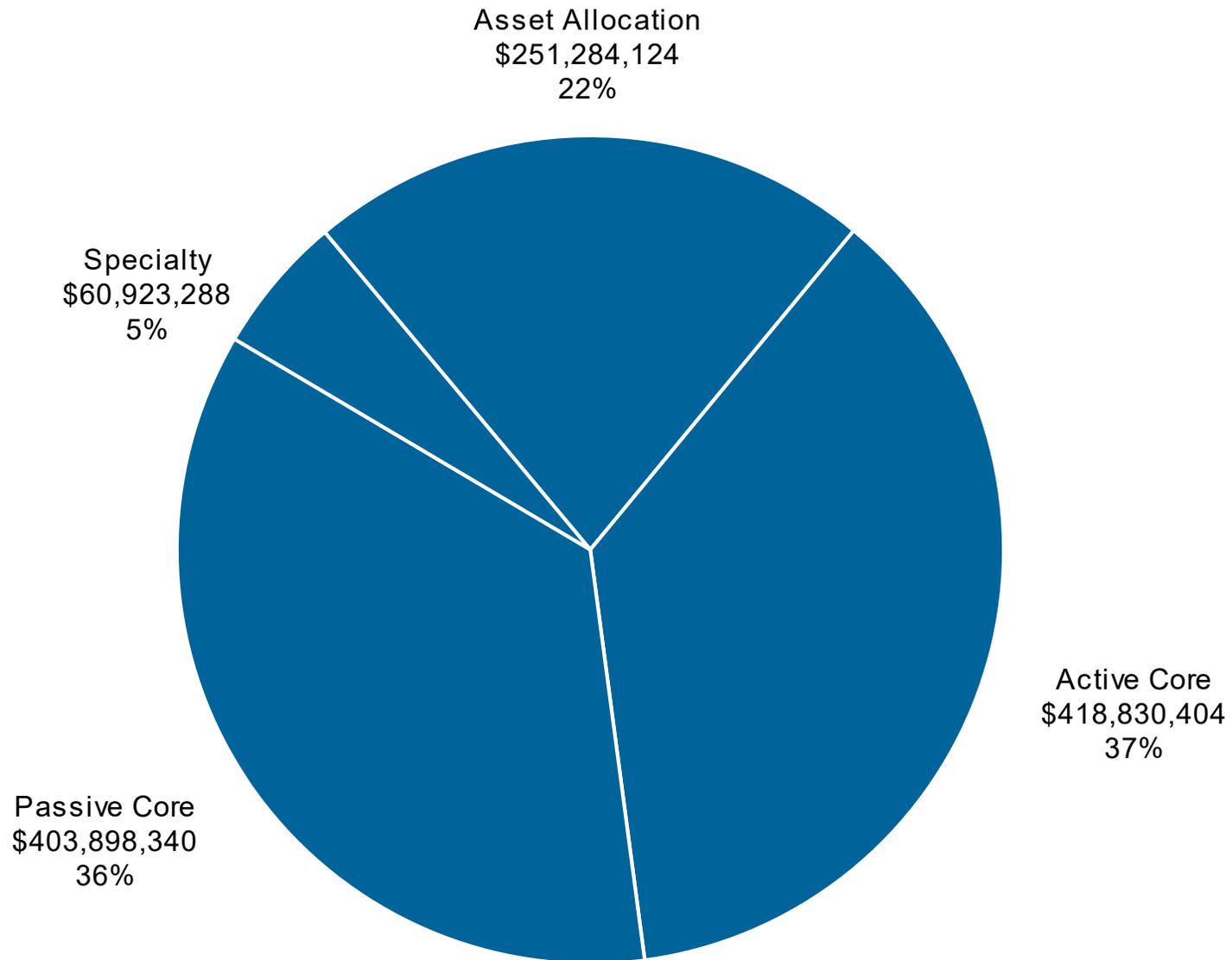
TRS DC Plan: Asset Changes

December 31, 2020



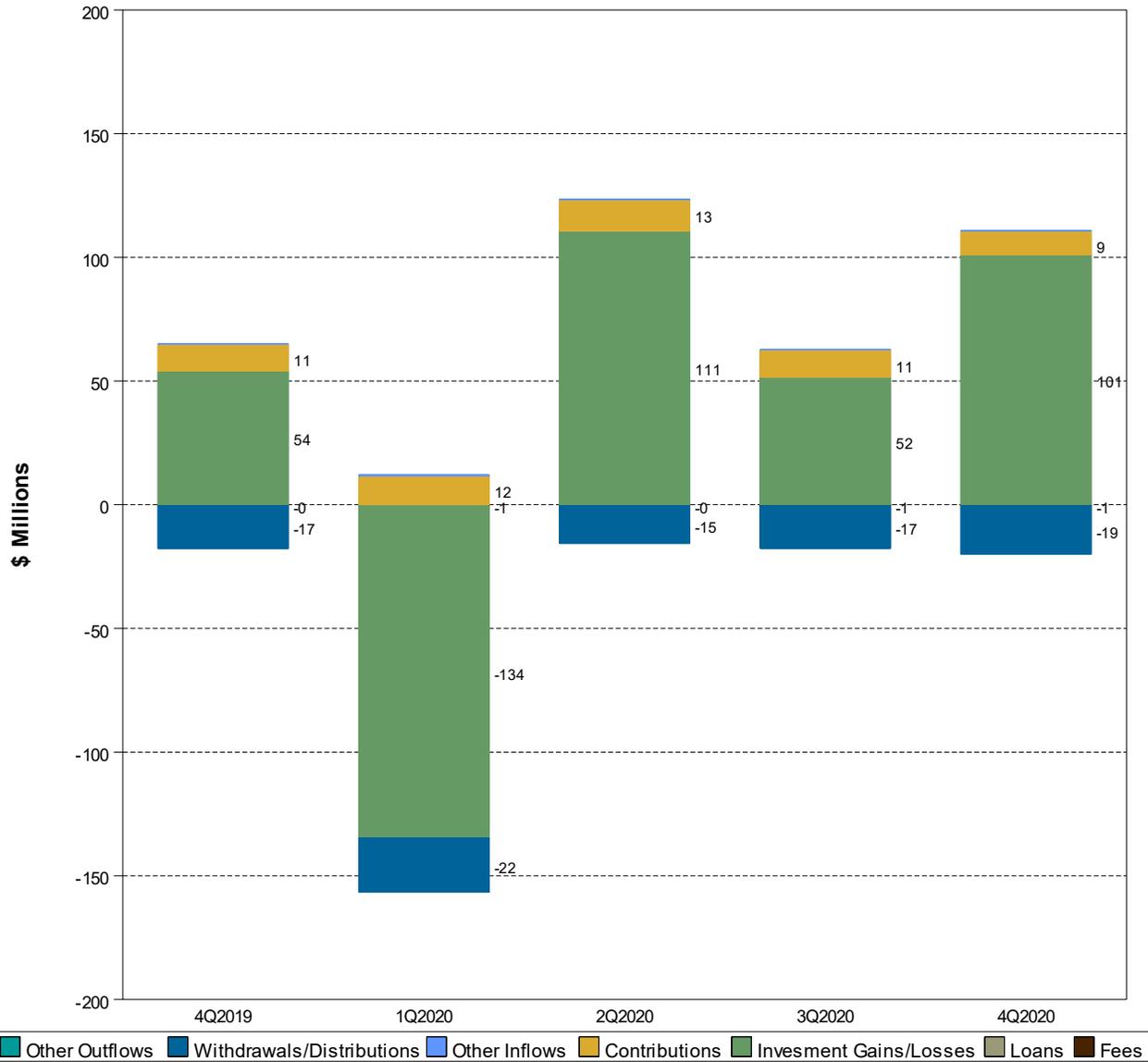
Deferred Comp Plan

December 31, 2020



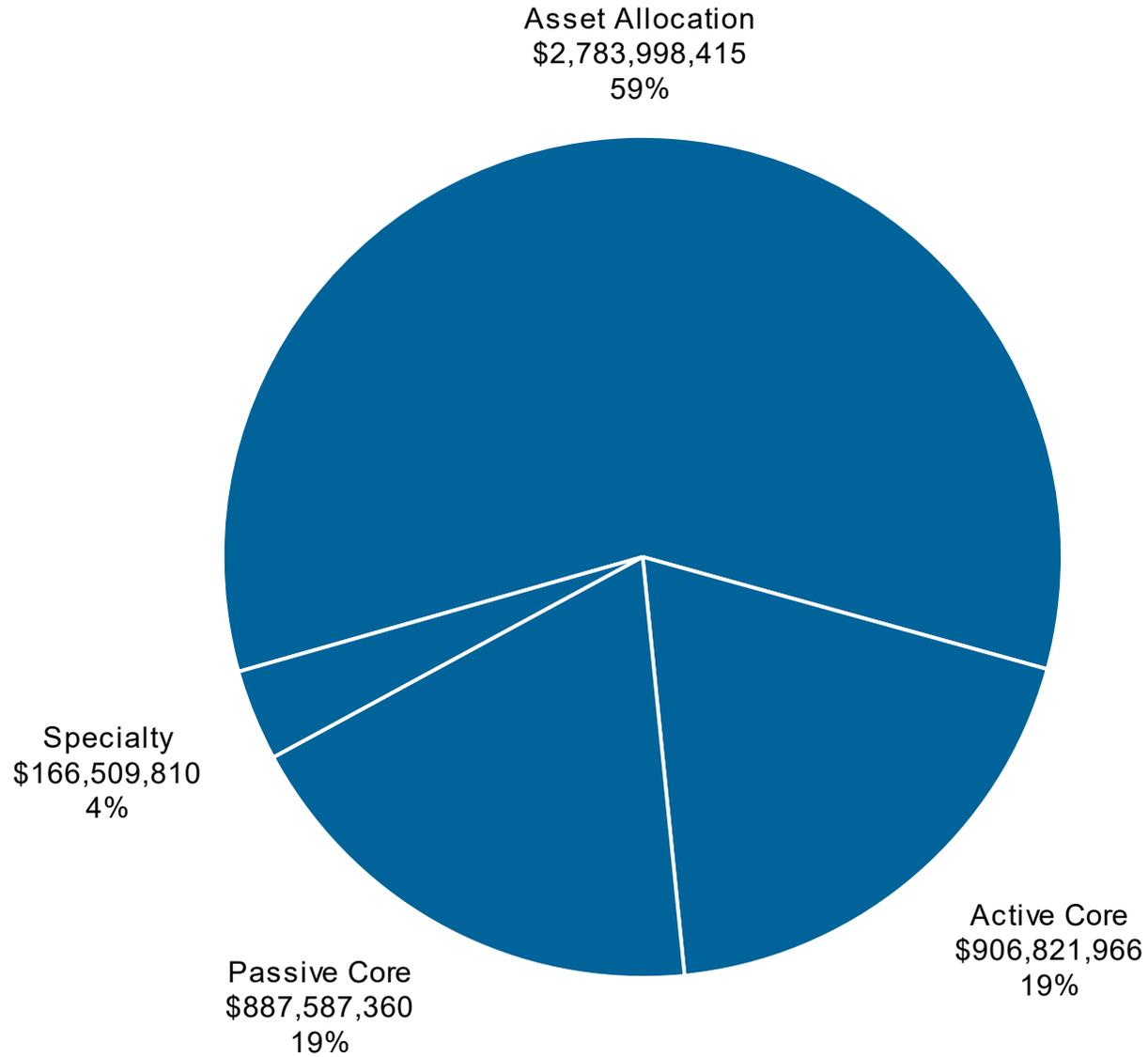
Deferred Comp Plan: Asset Changes

December 31, 2020



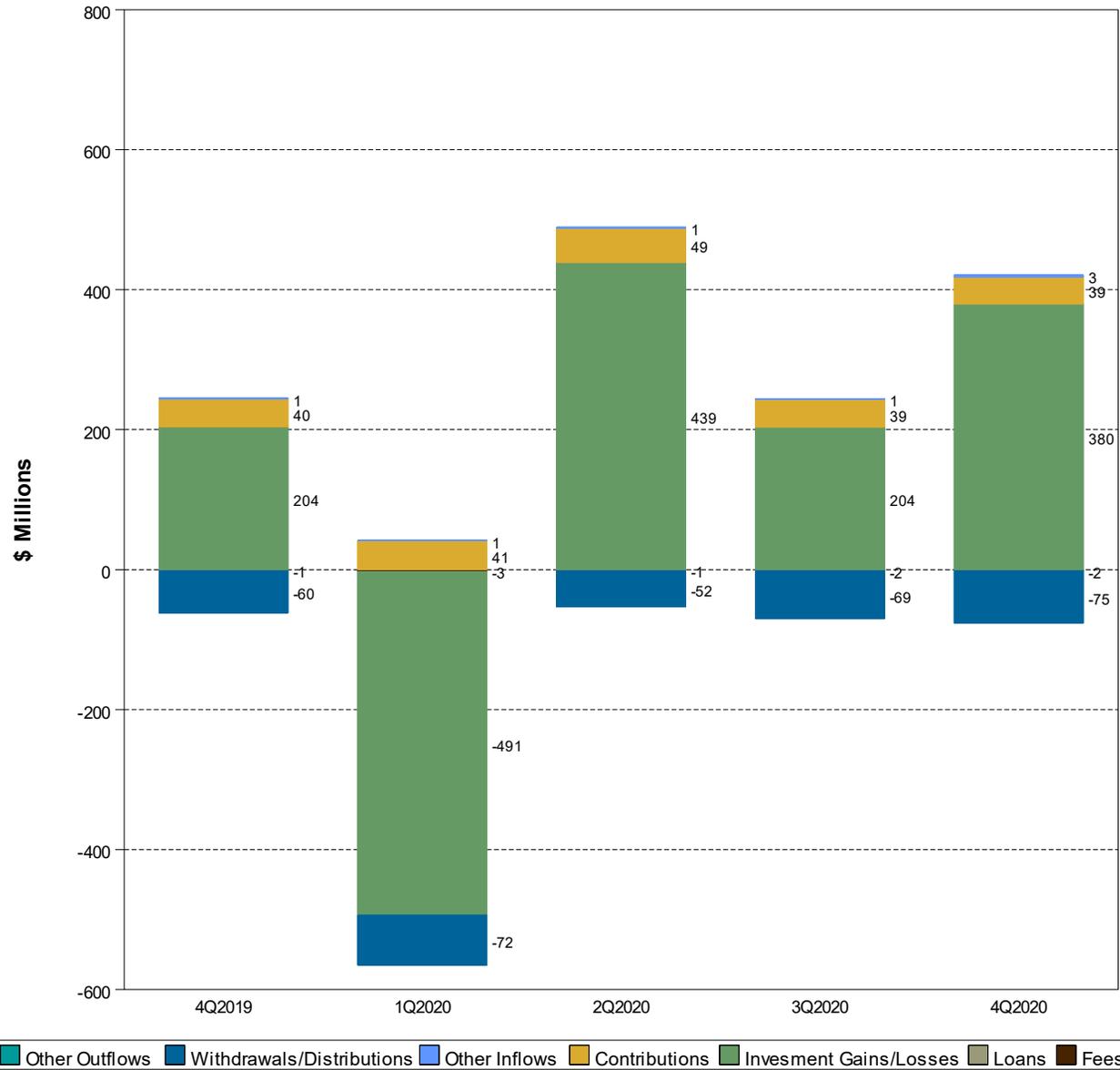
SBS Fund

December 31, 2020



SBS Fund: Asset Changes

December 31, 2020



Individual Account Option Performance: 12/31/20

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Asset Allocation										
Alaska Balanced Trust CAI MA Tgt Alloc Cons MFs Passive Target	5.5 ⁵⁶	10.8 ²¹	7.2 ¹³	7.2 ²⁰	6.0 ¹⁵	6.3 ⁶⁹		-0.0 ²¹	0.3 ¹⁰⁰	0.9 ¹⁰
	5.6 ⁵⁶	10.5 ²⁷	7.2 ¹⁴	7.2 ²⁰	6.0 ¹⁵	6.4 ⁶⁷				0.9 ¹¹
Alaska Long-Term Balanced CAI MA Tgt Alloc Mod MFs Passive Target	9.3 ⁴³	14.0 ²⁵	9.0 ²⁴	9.6 ²⁸	7.7 ²⁷	10.7 ⁶⁰		-0.4 ⁴⁵	0.4 ¹⁰⁰	0.8 ²⁴
	9.3 ⁴³	13.6 ²⁷	9.1 ²³	9.8 ²⁶	7.8 ²³	10.9 ⁵⁹				0.8 ²⁴
Target 2010 Trust CAI Tgt Date 2010 Custom Index	6.2 ⁵³	10.4 ⁷⁷	7.1 ⁶³	7.5 ⁶²	6.1 ⁴⁹	7.3 ⁵³		-0.3 ⁷⁹	0.3 ¹⁰⁰	0.9 ⁴³
	6.2 ⁵²	10.1 ⁷⁷	7.2 ⁵⁹	7.6 ⁶¹	6.2 ⁴²	7.4 ⁵⁰				0.9 ⁴⁶
Target 2015 Trust CAI Tgt Date 2015 Custom Index	7.1 ⁵⁴	11.5 ⁵³	7.8 ³²	8.4 ³⁵	6.8 ³²	8.4 ⁴¹		-0.0 ³⁵	0.3 ¹⁰⁰	0.9 ³⁸
	7.2 ⁵³	11.1 ⁵⁸	7.8 ³²	8.4 ³⁵	6.8 ³²	8.6 ⁴⁰				0.8 ⁴³
Target 2020 Trust CAI Tgt Date 2020 Custom Index	8.5 ²⁵	12.7 ²⁸	8.5 ¹⁸	9.5 ¹⁵	7.6 ¹⁴	10.1 ²⁶		-0.0 ¹⁶	0.4 ⁹⁹	0.8 ³⁰
	8.5 ²⁵	12.4 ³²	8.6 ¹⁸	9.5 ¹⁵	7.6 ¹⁴	10.3 ²⁴				0.8 ³⁸
Target 2025 Trust CAI Tgt Date 2025 Custom Index	9.9 ²³	14.0 ²¹	9.3 ⁹	10.4 ⁸	8.3 ⁶	11.7 ²⁰		-0.0 ¹⁰	0.4 ¹⁰⁰	0.8 ²⁹
	9.9 ¹⁸	13.6 ²⁷	9.3 ⁸	10.4 ⁸	8.3 ⁶	11.9 ¹⁷				0.8 ³⁶
Target 2030 Trust CAI Tgt Date 2030 Custom Index	11.1 ²⁹	15.1 ²⁰	9.9 ¹⁴	11.2 ¹⁶	8.8 ¹¹	13.1 ²⁷		-0.2 ²⁶	0.3 ¹⁰⁰	0.8 ²⁰
	11.1 ²⁸	14.7 ²³	9.9 ¹¹	11.2 ¹³	8.9 ¹⁰	13.3 ²⁵				0.8 ²²
Target 2035 Trust CAI Tgt Date 2035 Custom Index	12.2 ⁴⁵	16.1 ²²	10.4 ¹⁸	11.9 ¹⁵	9.3 ¹⁷	14.4 ⁴⁴		-0.2 ²¹	0.4 ¹⁰⁰	0.7 ¹⁶
	12.2 ⁴²	15.7 ²⁵	10.5 ¹⁶	11.9 ¹⁵	9.3 ¹⁵	14.5 ⁴¹				0.7 ¹⁹
Target 2040 Trust CAI Tgt Date 2040 Custom Index	13.1 ⁵⁵	16.8 ²¹	10.8 ¹⁶	12.4 ¹⁷	9.7 ¹³	15.4 ⁵³		-0.2 ²¹	0.4 ¹⁰⁰	0.7 ¹⁰
	13.1 ⁵⁵	16.4 ²⁷	10.8 ¹⁶	12.4 ¹⁶	9.7 ¹²	15.5 ⁴⁸				0.7 ¹¹
Target 2045 Trust CAI Tgt Date 2045 Custom Index	13.9 ⁵⁹	17.3 ²⁴	11.1 ¹²	12.7 ¹²	9.9 ¹⁰	16.1 ⁶¹		-0.2 ¹⁹	0.4 ⁹⁸	0.7 ⁹
	13.9 ⁶²	16.9 ²⁹	11.1 ¹¹	12.7 ¹¹	9.9 ¹⁰	16.3 ⁵⁹				0.7 ¹³

Returns:
■ above median
■ third quartile
■ fourth quartile

Risk:
■ below median
■ second quartile
■ first quartile

Risk Quadrant:

 Return
 Risk

Excess Return Ratio:
■ above median
■ third quartile
■ fourth quartile

Tracking Error:
■ below median
■ second quartile
■ first quartile

Sharpe Ratio:
■ above median
■ third quartile
■ fourth quartile

Individual Account Option Performance: 12/31/20

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Target 2050 Trust CAI Tgt Date 2050	13.9 ⁶⁷	17.3 ²⁷	11.1 ¹⁴	12.6 ¹³	9.9 ¹⁰	16.1 ⁷⁴		-0.2 ²³	0.4 ¹⁰⁰	0.7 ⁷
Custom Index	13.9 ⁶⁸	16.9 ³¹	11.1 ¹²	12.7 ¹⁰	9.9 ⁹	16.3 ⁶⁸				0.7 ⁷
Target 2055 Trust CAI Tgt Date 2055	13.9 ⁷⁷	17.3 ²⁹	11.1 ¹⁶	12.7 ¹⁵	9.9 ¹⁷	16.1 ⁷⁷		-0.2 ²⁴	0.4 ⁹⁹	0.7 ⁷
Custom Index	13.9 ⁷⁹	16.9 ³⁰	11.1 ¹⁴	12.7 ¹⁴	9.9 ¹⁵	16.3 ⁷²				0.7 ⁸
Target 2060 Trust CAI Tgt Date 2060	13.8 ⁷⁴	17.2 ³⁰	11.0 ²⁴	12.6 ³⁰		16.1 ⁷⁷		-0.5 ⁴⁷	0.4 ¹⁰⁰	0.7 ¹³
Custom Index	13.9 ⁷³	16.9 ³²	11.1 ¹⁷	12.7 ¹⁷		16.3 ⁷¹				0.7 ¹²
Target 2065 Trust CAI Tgt Date 2065	13.8 ⁸⁷									
Custom Index	13.9 ⁸⁶									

Returns:
■ above median
■ third quartile
■ fourth quartile

Risk:
■ below median
■ second quartile
■ first quartile

Risk Quadrant:


Excess Return Ratio:
■ above median
■ third quartile
■ fourth quartile

Tracking Error:
■ below median
■ second quartile
■ first quartile

Sharpe Ratio:
■ above median
■ third quartile
■ fourth quartile

Other Options: 12/31/20

Passive Strategies

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Index Funds										
SSgA S&P 500 Index Fund (i) Callan S&P 500 Index MFs	12.1 ²⁶	18.4 ²³	14.2 ¹⁶	15.2 ¹²	12.9 ¹⁵	17.2 ⁴⁹		-0.8 ¹³	0.0 ⁸⁷	0.8 ¹¹
S&P 500 Index	12.1 ¹⁷	18.4 ¹³	14.2 ⁸	15.2 ⁸	12.9 ⁶	17.2 ³⁸				0.8 ⁸
SSgA Russell 3000 Index Fund (i) CAI Mut Fd: Large Cap Broad Style (Net)	14.6 ³¹	20.8 ⁴⁷	14.5 ⁴⁷	15.4 ⁴⁵	12.8 ⁴⁶	18.4 ⁵⁷		-0.7 ⁶⁵	0.0 ¹⁰⁰	0.8 ⁴⁷
Russell 3000 Index	14.7 ³¹	20.9 ⁴⁷	14.5 ⁴⁷	15.4 ⁴⁵	12.8 ⁴⁶	18.4 ⁵⁷				0.8 ⁴⁷
SSgA World Equity ex-US Index Fund (i) CAI MF: Non-U.S. Equity Style	16.7 ⁴⁶	10.8 ⁵²	5.0 ⁴⁶	9.2 ³⁹	4.9 ⁴⁷	18.3 ⁷¹		0.3 ³⁰	0.9 ¹⁰⁰	0.4 ³⁷
MSCI ACWI x U.S. Index (Net)	17.0 ⁴⁵	10.7 ⁵³	4.9 ⁴⁸	8.9 ⁴⁰	4.8 ⁵³	18.1 ⁸⁰				0.4 ³⁸
BlackRock Passive US Bd Index Fund (i) Callan Core Bond MFs	0.7 ⁸⁹	7.5 ⁹⁰								
Blmbg Aggregate	0.7 ⁹⁰	7.5 ⁹⁰	5.3 ⁸⁰	4.4 ⁸³	4.1 ⁷²	3.2 ⁷⁸				1.0 ⁶⁹

Returns:
■ above median
■ third quartile
■ fourth quartile

Risk:
■ below median
■ second quartile
■ first quartile

Risk Quadrant:


Excess Return Ratio:
■ above median
■ third quartile
■ fourth quartile

Tracking Error:
■ below median
■ second quartile
■ first quartile

Sharpe Ratio:
■ above median
■ third quartile
■ fourth quartile

(i) – Indexed scoring method used. Green: manager & index ranking differ by less than +/- 10 percentiles; Yellow: manager and index ranking differ by +/- 20 percentiles; Red: manager & index ranking differ by more than 20 percentiles.

Other Options: 12/31/20

Active Equity, Stable Value, and Money Market

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Active and Other Funds										
BlackRock Strategic Completion Fd Callan Real Assets MFs Strategic Completion Custom Index	7.7 ⁶⁶	2.7 ⁶¹								
Northern Trust ESG Fund Callan Lg Cap Broad MF MSCI USA ESG	11.8 ⁶⁴	18.5 ⁵⁰								
International Equity Fund CAI Mut Fd: Non-U.S. EquityStyle MSCI ACWI ex US Index	11.9 ⁶³	18.8 ⁴⁹	14.9 ⁴⁷	15.3 ⁴⁵	12.5 ⁴⁹	16.3 ⁹²				0.9 ³⁵
T. Rowe Price Small Cap CAI Mut Fd: Sm Cap Broad Style Russell 2000 Index	18.6 ²⁹	16.2 ²⁶	6.9 ⁴⁰	7.9 ⁴⁷		19.6 ⁴²		-0.3 ⁵¹	3.3 ⁸²	0.3 ⁵⁷
T. Rowe Price Stable Value Callan Stable Value CT FTSE 3 Mo T-Bill	17.0 ⁴⁵	10.7 ⁵³	4.9 ⁴⁸	8.9 ⁴⁰	4.8 ⁵³	18.1 ⁸⁰				0.4 ³⁸
T. Rowe Price Small Cap CAI Mut Fd: Sm Cap Broad Style Russell 2000 Index	25.5 ⁶⁹	25.1 ⁴⁸	17.7 ³⁷	17.5 ³⁶	12.9 ³⁸	22.9 ⁹⁰		0.8 ¹⁶	6.3 ⁷⁰	0.7 ²⁵
T. Rowe Price Stable Value Callan Stable Value CT FTSE 3 Mo T-Bill	31.4 ¹⁹	20.0 ⁵⁴	10.2 ⁵⁴	13.3 ⁵³	9.3 ⁵⁴	26.4 ⁵¹				0.5 ⁵⁵
T. Rowe Price Stable Value Callan Stable Value CT FTSE 3 Mo T-Bill	0.6 ⁴	2.4 ¹	2.5 ¹	2.4 ¹	2.5 ¹	0.1 ⁹³		3.3 ⁶	0.4 ²⁰	16.8 ¹
SSgA Inst Treasury Money Market Callan MoneyMarket Funds FTSE 3 Mo T-Bill	0.0 ⁹⁹	0.6 ⁹⁹	1.6 ⁹⁴	1.2 ⁹⁸	0.8 ¹⁰⁰	0.4 ¹				-0.1 ⁹⁸
SSgA Inst Treasury Money Market Callan MoneyMarket Funds FTSE 3 Mo T-Bill	0.0 ⁹⁸	0.4 ¹⁶	1.4 ¹⁰	1.0 ⁹	0.7 ¹⁰	0.4 ⁹		-3.4 ²³	0.0 ⁹⁴	-0.4 ⁸
SSgA Inst Treasury Money Market Callan MoneyMarket Funds FTSE 3 Mo T-Bill	0.0 ⁶	0.6 ⁴	1.6 ²	1.2 ²	0.8 ²	0.4 ⁷				-0.1 ²

Returns:
■ above median
■ third quartile
■ fourth quartile

Risk:
■ below median
■ second quartile
■ first quartile

Risk Quadrant:


Excess Return Ratio:
■ above median
■ third quartile
■ fourth quartile

Tracking Error:
■ below median
■ second quartile
■ first quartile

Sharpe Ratio:
■ above median
■ third quartile
■ fourth quartile

Callan

Callan Update

Published Research Highlights from 4Q20

Under the Hood of Alternative Beta



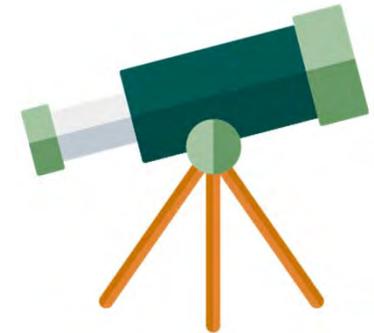
A Primer on Green Building Certifications



Private Equity 'Research Café'



And coming in 2021: Our Capital Markets Assumptions



Recent Blog Posts

Will Boring Still Be Beautiful?

James Veneruso

The Private Equity Playbook: Playing Offense

Alternatives Consulting Group

Plus our [blog](#) contains a wide array of posts related to the pandemic

Additional Reading

Private Equity Trends quarterly newsletter

Active vs. Passive quarterly charts

Capital Markets Review quarterly newsletter

Monthly Updates to the Periodic Table

Market Pulse Flipbook quarterly markets update

Callan Institute Events

Upcoming conferences, workshops, and webinars

March Workshop - Virtual

March 25, 2021

9:00 – 10:15am (45 minutes prepared remarks; 30 minutes Q&A)

A Fresh Look at Fixed Income – Generating Yield in a Zero Interest Rate Environment

As expectations for interest rates continue to fall, asset owners and fund managers are looking for new ways to generate returns. In this workshop, our consultants and specialists will share:

- How the drop in interest rate expectations impacts different types of investors.
- What Callan research has identified as potential approaches for garnering income and returns.
- What asset owners should consider as they evaluate options for their fixed income mandates.

This is your chance to step back and think differently about fixed income. You'll come away with a deeper understanding of the issues facing asset owners and how they are thinking about their options moving forward.

Callan College

Learn the Fundamentals

This course is for institutional investors, including trustees and staff members of nonprofits, and public and corporate funds. This session familiarizes fund sponsor trustees and staff with basic investment theory, terminology, and practices.

Join our next virtual session:

April 13, 2021 – April 15, 2021

2-3 hour sessions over 3 days

Join our next LIVE session in San Francisco:

July 14, 2021 – July 15, 2021

1.5 day session held in Callan's San Francisco office

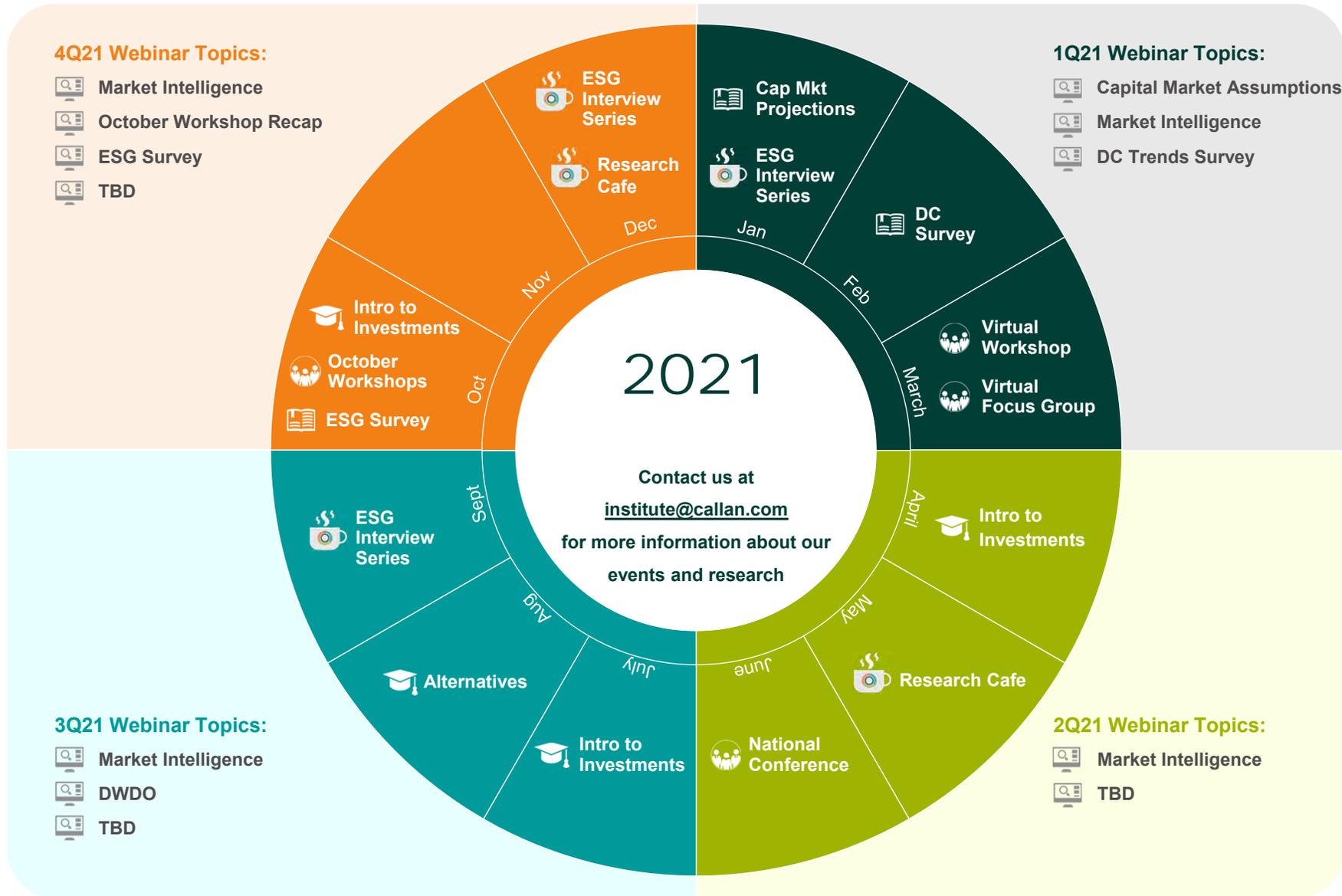
Save the Date!

2021 National Conference

Summer 2021

We can't wait to see you!

Content Calendar – Callan Institute



Callan Updates

Firm updates by the numbers, as of Dec. 31, 2020

Total Associates: 198

Ownership

- 100% employees
- Broadly distributed across 99 shareholders

Leadership Changes

- No changes to leadership this quarter

Total General and Fund Sponsor Consultants: more than 45

Total Specialty and Research Consultants: more than 60

Total CFA/CAIA/FRMs: more than 55

Total Fund Sponsor Clients: more than 400

AUA: more than \$2.5 trillion

“One of the silver linings of the current work-from-home environment is the record attendance we have seen for our virtual education events. This includes our webinars, workshops, and our fiduciary education series, the ‘Callan College.’ Since education has always been at the heart of Callan’s consulting business, it’s encouraging to see our clients and associates adapt to the current situation and make education an even greater priority.”

- CEO & Chief Research Officer Greg Allen on Callan's COVID-19 Response



Fidelity Institutional Asset Management

Mandate: Tactical Allocation

Hired: 2018

Firm Information	Investment Approach	Total ARMB Mandate
<p>Fidelity Investments was founded in 1946 by Edward C. Johnson II. Fidelity is one of the largest independently-owned investment management organizations in the world with over \$2.4 trillion in assets under management. The Johnson family owns 49% of the firm; Fidelity employees own the remainder.</p> <p>Key Executives: <i>Kristin Shofner</i>, Senior Vice President <i>Christine Thorpe</i>, Senior Account Executive <i>Cathy Pena</i>, Portfolio Manager, Signaling</p>	<p>The Fidelity Signaling strategy is a multi-asset, tactical allocation strategy based on Fidelity’s proprietary business cycle models. The strategy is based on the expectation that the stage of the business cycle drives asset class performance and risk characteristics. Overall portfolio risk and allocation to asset classes is adjusted over time based on business cycle assessment. The benchmark is 60% MSCI ACWI IMI Net and 40% Bloomberg Barclays US Aggregate. Signaling is in ARMB’s Opportunistic Asset Class.</p> <p>Benchmark: 60% MSCI ACWI Net, 40% Bloomberg Barclays US Aggregate</p>	<p>Assets Under Management (\$millions): 12/31/20: \$583</p>

Concerns: None

12/31/2020 Performance (gross of fees)

	<u>Last Quarter</u>	<u>1-Year</u>	<u>2-Years Annualized</u>	<u>5-Years Annualized</u>
Signaling	10.16%	13.93%	17.09%	-
Benchmark	9.62%	13.56%	16.38%	-

Presentation to:

State of Alaska

Fidelity Signaling Portfolio Review

Cathy Pena, CFA
Portfolio Manager

Kristin Shofner
Senior Vice President, Business Development

For Institutional Use Only.



Table of Contents

1. Topics for Discussion
2. Challenges of Asset Allocation in a Low Yield World
3. Risk Calibration
4. Fidelity Signaling Mandate
5. Performance
6. Capital Market Outlook
7. Appendix
 - A. Holdings Performance
 - B. Biographies
 - C. Important Information

Current performance may substantially differ from, and could be significantly lower than, performance shown due to recent significant market volatility. Please contact FIAM for updated performance numbers after the tenth business day following quarter end.

This document does not make an offer or solicitation to buy or sell any securities or services, and is not investment advice. FIAM does not provide legal or tax advice and we encourage you to consult your own lawyer, accountant, or other advisor before making an investment.

Information provided in this document is for informational and educational purposes only. To the extent any investment information in this material is deemed to be a recommendation, it is not meant to be impartial investment advice or advice in a fiduciary capacity and is not intended to be used as a primary basis for you or your client's investment decisions. Fidelity and its representatives may have a conflict of interest in the products or services mentioned in this material because they have a financial interest in them, and receive compensation, directly or indirectly, in connection with the management, distribution, and/or servicing of these products or services, including Fidelity funds, certain third-party funds and products, and certain investment services.

See "Important Information" for a discussion of performance data, some of the principal risks related to any of the investment strategies referred to in this presentation, professional designations and how they are obtained, and other information related to this presentation.

2 For Institutional Use Only.

202102-28500



Topics for Discussion

Strategic Asset Allocation: Considerations in the Current Environment

- Challenges of a low yield, low expected return environment
- Proposed risk calibration

Active Asset Allocation: The Fidelity Signaling mandate

- Review of Business Cycle Loss Aversion (“BCLA”) investment process
- Recent enhancements
- Performance
- Current macro views
- Positioning over time

Challenges of Asset Allocation in a Low Yield World

Yields at the ZLB: Low Expected Return Environment

Low bond yields reflect low expected growth and point to low future asset returns

10 YEAR US TREASURY YIELDS AT TIME OF PURCHASE AND
SUBSEQUENT 10 YEAR ANNUALIZED GROSS RETURNS ON CORE BONDS
JANUARY 1976 – DECEMBER 2020



Source: Bloomberg.

Past performance is no guarantee of future results.

5 For Institutional Use Only.
202102-28500



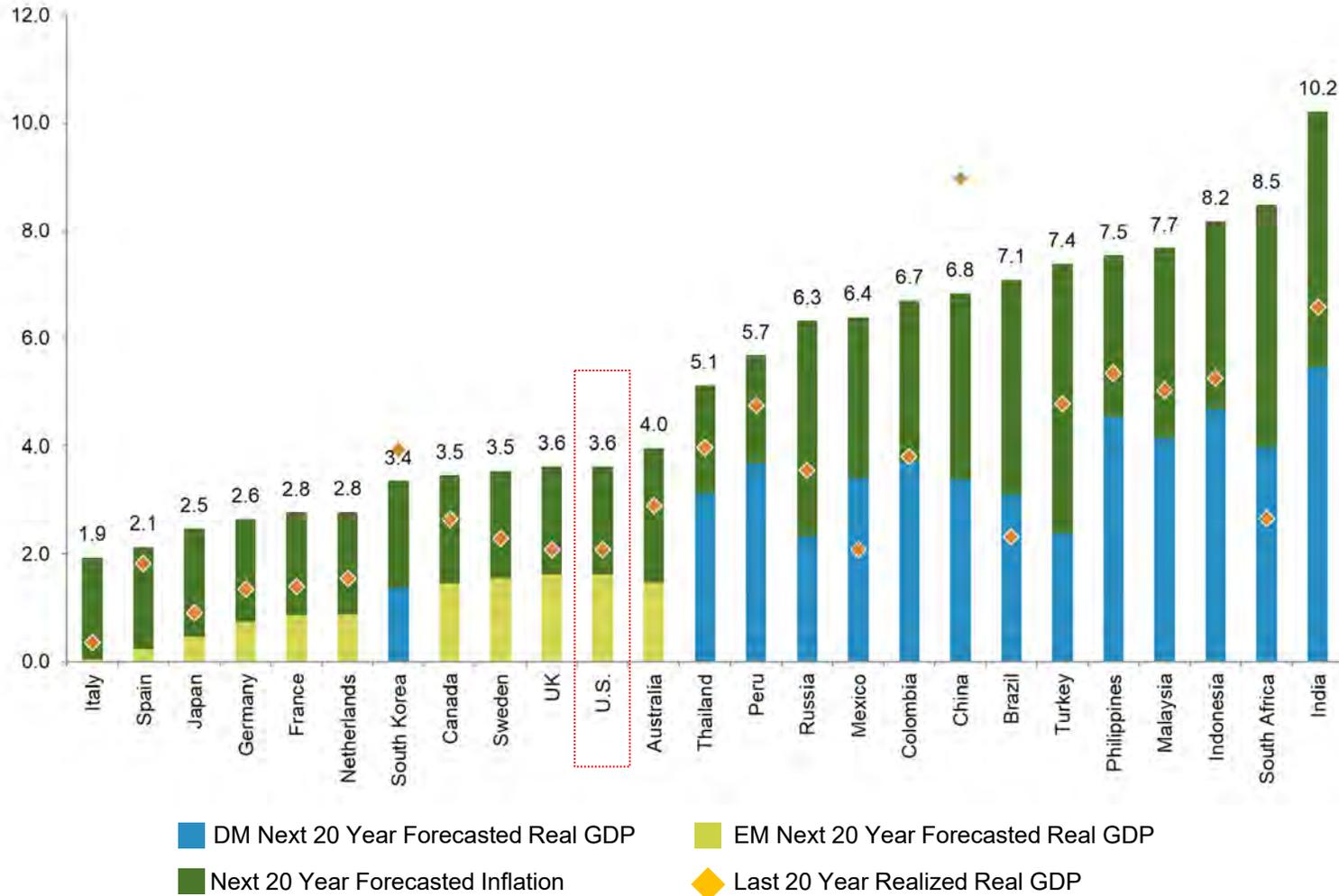
What Drives Interest Rates?

In equilibrium, interest rates approach GDP growth rates



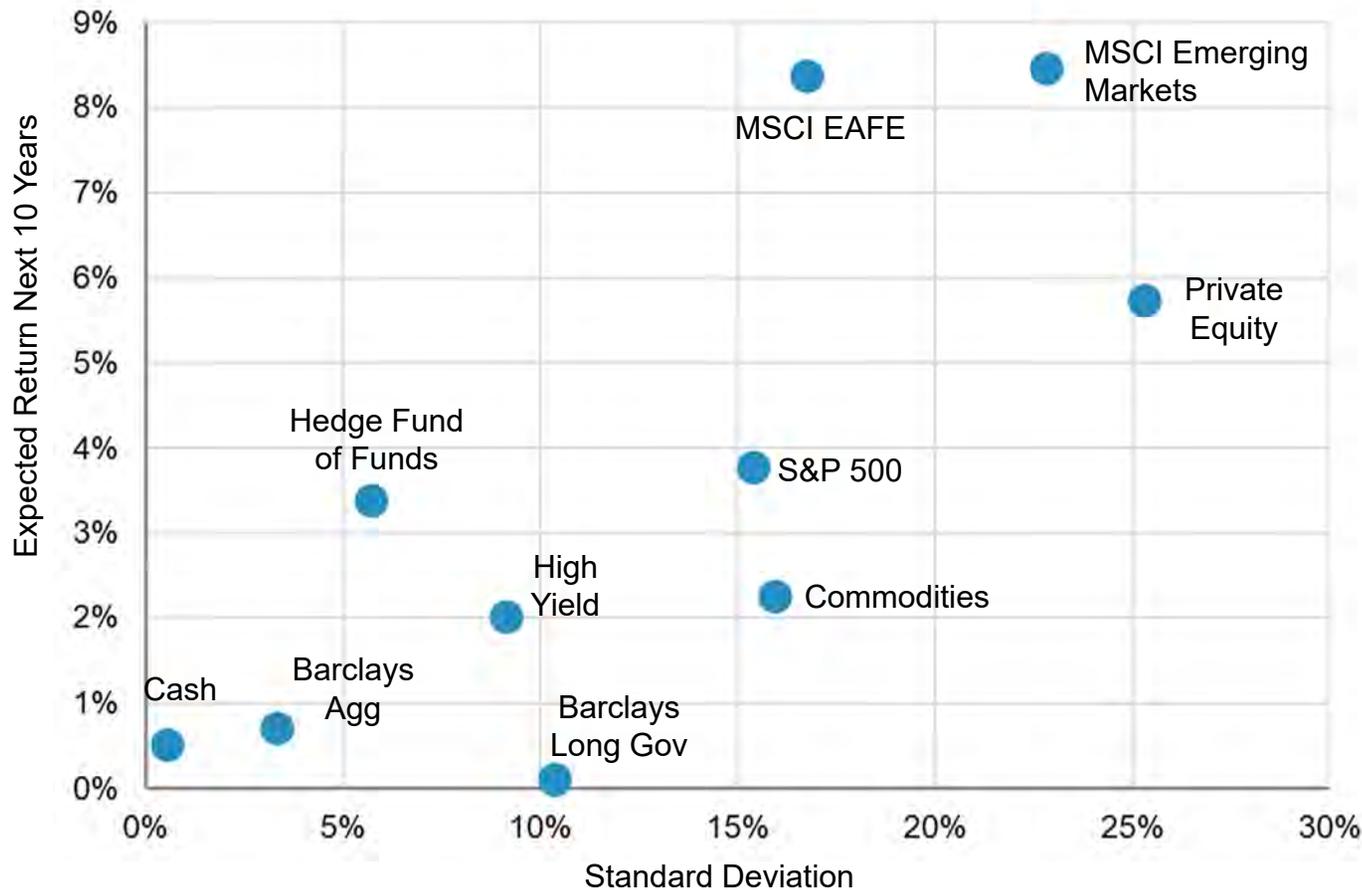
Nominal GDP Growth Forecast 2019–2038

Annualized Rate (%)



Looking Forward...low rates and low returns

NEXT 10 YEARS EXPECTED GROSS RETURN VS. STANDARD DEVIATION



See appendix for methodology for long-term expected returns and volatility statistics.

Note on Expected Long Term Returns (EROA) and Volatility Statistics:

Expected returns based on GIS 10-Year Capital Market Outlook. All risk statistics, including historical volatility, VaR, beta and max drawdown based on historical volatility and correlation of each asset class from January 1998 through 12/31/2020. Past performance is no guarantee of future results. Source: FMR Co.

Expected Long-Term Return is presented gross of fees, including advisory fees, which when deducted will reduce returns. Although FIAM believes it has a reasonable basis for any gross target return, there can be no assurance that actual results will be comparable. Actual results will depend on market conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Hypothetical data has inherent limitations due to the retroactive application of a model designed with the benefit of hindsight and may not reflect the effect that any material market or economic factors may have had on FIAM's use of the model during the time periods shown. Thus, Hypothetical Performance is speculative and of extremely limited use to any investor and should not be relied upon in any way.

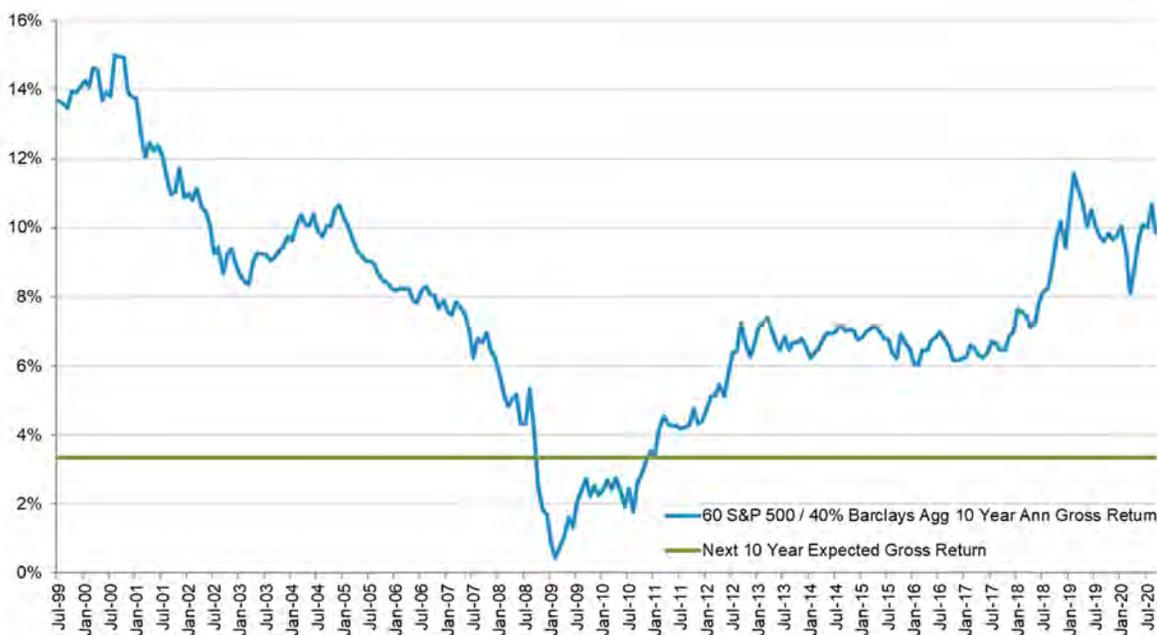
Analysis performed using Factset, Bloomberg, and a proprietary model. All strategies proxied with market indexes, including: S&P 500, MSCI EAFE, MSCI Emerging Markets Equity, Bloomberg Commodity Index, Bloomberg Barclays U.S. High Yield, Bloomberg Barclays U.S. Long Government, HFRI Fund of Funds Index, LPX50 Listed Private Equity Index, and Bloomberg Barclays 3-Month T-Bill. Index performance does not reflect the deduction of advisory fees, transaction charges and other expenses, which would reduce performance. Investing directly in an index is not possible.



Strategic Design

What next for 60 / 40?

NEXT 10 YEARS EXPECTED RETURN FOR A 60 / 40 S&P 500 / BARCLAYS AGG PORTFOLIO VS. HISTORICAL ROLLING 10 YEAR RETURNS (ALL SERIES GROSS) JANUARY 1989 – DECEMBER 2020



See appendix for methodology for long-term expected returns and volatility statistics.

Note on Expected Long Term Returns (EROA) and Volatility Statistics:

Expected returns based on GIS 10-Year Capital Market Outlook. All risk statistics, including historical volatility, VaR, beta and max drawdown based on historical volatility and correlation of each asset class from January 1998 through 12/31/2020. Past performance is no guarantee of future results. Source: FMR Co.

Expected Long-Term Return is presented gross of fees, including advisory fees, which when deducted will reduce returns. Although FIAM believes it has a reasonable basis for any gross target return, there can be no assurance that actual results will be comparable. Actual results will depend on market conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Hypothetical data has inherent limitations due to the retroactive application of a model designed with the benefit of hindsight and may not reflect the effect that any material market or economic factors may have had on FIAM's use of the model during the time periods shown. Thus, Hypothetical Performance is speculative and of extremely limited use to any investor and should not be relied upon in any way.

Analysis performed using Factset, Bloomberg, and a proprietary model. All strategies proxied with market indexes, including: S&P 500 and Bloomberg Barclays U.S. Aggregate Bond Index. Index performance does not reflect the deduction of advisory fees, transaction charges and other expenses, which would reduce performance. Investing directly in an index is not possible.

Past performance is no guarantee of future results.

9 For Institutional Use Only.

202102-28500



How are clients responding to these challenges?

Move out the risk spectrum

- 
- Active Management – security selection + active allocation
 - Add “opportunistic income”
 - Equity mix shift
 - Less US, more International
 - Less Large Cap, more Small Cap
 - Less Growth, more Value
 - Add to equities
 - More alternative
 - Low correlation to traditional asset classes (e.g. Hedge Funds)
 - Higher expected return (e.g. Private Equity)
 - Leverage

Challenges

- Taking more risk creates the potential for larger drawdowns
- With rates near the zero lower bound, the ability of falling rates to hedge equity drawdowns is diminished

Risk Calibration

Return and Risk Characteristics

Alaska Policy Benchmark, Current and Proposed

Asset Class	Benchmark	Current Alaska Asset Allocation	Proposed Alaska Asset Allocation	Next 10 Years Expected Returns (gross)	Out of Benchmark?	Bands
Capital Appreciation		60.00%	70.00%			+/- 15%
US Equity		0.00%	0.00%			
US Large Cap	S&P 500	0.00%	0.00%	3.77%		
US SMID Cap	Russell 2500	0.00%	0.00%	2.55%		
Non-US Equity		0.00%	0.00%			
EAFE	MSCI EAFE	0.00%	0.00%	8.36%		
Emerging Markets Equity	MSCI Emerging Markets	0.00%	0.00%	8.45%		
Global Equity		60.00%	70.00%			+/- 15%
Global Equity	MSCI ACWI IMI	60.00%	70.00%	5.73%		
Inflation Protection		0.00%	0.00%			
Commodities	Bloomberg Commodity Index	0.00%	0.00%	2.24%	Y	0 - 5%
US REITs	FTSE NAREIT Equity REITs	0.00%	0.00%	5.34%	Y	0 - 5%
High Yield		0.00%	0.00%			
US High Yield	Bloomberg Barclays US High Yield	0.00%	0.00%	1.99%	Y	0 - 5%
Capital Preservation		40.00%	30.00%			+/- 15%
US Core Bonds	Bloomberg Barclays US Aggregate	40.00%	30.00%	0.69%		+/- 15%
US Long Government	Bloomberg Barclays US Long Government	0.00%	0.00%	0.10%	Y	0 - 10%
US TIPS	Bloomberg Barclays US Inflation Linked	0.00%	0.00%	1.04%	Y	0 - 15%
USD Cash	Bloomberg Barclays 3 month T-Bill	0.00%	0.00%	0.50%	Y	0 - 10%
Total		100.00%	100.00%	100.00%		

Expected returns based on GIS 10-Year Capital Market outlook. All risk statistics, including historical volatility, VaR, beta and max drawdown based on historical volatility and correlation of each asset class from January 1998 through 12/31/2020. Past performance is no guarantee of future results.

Source: FMR Co.

Expected Long-Term Return is presented gross of fees, including advisory fees, which when deducted will reduce returns. Although FIAM believes it has a reasonable basis for any gross target return, there can be no assurance that actual results will be comparable. Actual results will depend on market conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Hypothetical data has inherent limitations due to the retroactive application of a model designed with the benefit of hindsight and may not reflect the effect that any material market or economic factors may have had on FIAM's use of the model during the time periods shown. Thus, Hypothetical Performance is speculative and of extremely limited use to any investor and should not be relied upon in any way.

Return and Risk Characteristics

Alaska Policy Benchmark, Current and Proposed

Statistics and Characteristics	Current Alaska Asset Allocation	Proposed Alaska Asset Allocation
Long Term Expected Return (gross)		
Expected Portfolio Return	4.0%	4.5%
Expected Sharpe/Info Ratio	0.36	0.35
Risk		
Historical Volatility	9.8%	11.4%
Asset VaR (5%ile)	-10.8%	-12.5%
Beta to M1WD Index	0.60	0.71
Maximum Drawdown	-35.8%	-41.2%
Duration	2.5	1.9
10-Year Horizon Expectations		
95th Percentile Expected Return	9.2%	10.5%
75th Percentile Expected Return	6.1%	6.9%
50th Percentile Expected Return	4.0%	4.5%
25th Percentile Expected Return	2.0%	2.1%
5th Percentile Expected Return	-0.9%	-1.2%
Equity Exposure: Regional Breakdown		
US Equity	33.93%	39.58%
EAFE	16.58%	19.34%
Canada	1.64%	1.92%
Emerging Markets	7.85%	9.15%
US / Dev Non-US / EM	57% / 30% / 13%	57% / 30% / 13%

See appendix for methodology for long-term expected returns and volatility statistics.

Note on Expected Long Term Returns (EROA) and Volatility Statistics:

Expected returns based on GIS 10-Year Capital Market Outlook. All risk statistics, including historical volatility, VaR, beta and max drawdown based on historical volatility and correlation of each asset class from January 1998 through 12/31/2020. Past performance is no guarantee of future results. Source: FMR Co.

Expected Long-Term Return is presented gross of fees, including advisory fees, which when deducted will reduce returns. Although FIAM believes it has a reasonable basis for any gross target return, there can be no assurance that actual results will be comparable. Actual results will depend on market conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Conditions over a full market cycle and any developments that may affect these investments and will be reduced by the deduction of any fees and expenses associated with the investment. Hypothetical data has inherent limitations due to the retroactive application of a model designed with the benefit of hindsight and may not reflect the effect that any material market or economic factors may have had on FIAM's use of the model during the time periods shown. Thus, Hypothetical Performance is speculative and of extremely limited use to any investor and should not be relied upon in any way.

Analysis performed using Factset, Bloomberg, and a proprietary model. All strategies proxied with market indexes, including: MSCI ACWI IMI, Bloomberg Commodity Index, FTSE NAREIT Equity REITs, Bloomberg Barclays U.S. High Yield, Bloomberg Barclays U.S. Long Government, Bloomberg Barclays TIPS 1-10 Yr, and Bloomberg Barclays 3-Month T-Bill. Index performance does not reflect the deduction of advisory fees, transaction charges and other expenses, which would reduce performance. Investing directly in an index is not possible.

Fidelity Signaling Mandate

For Institutional Use Only.



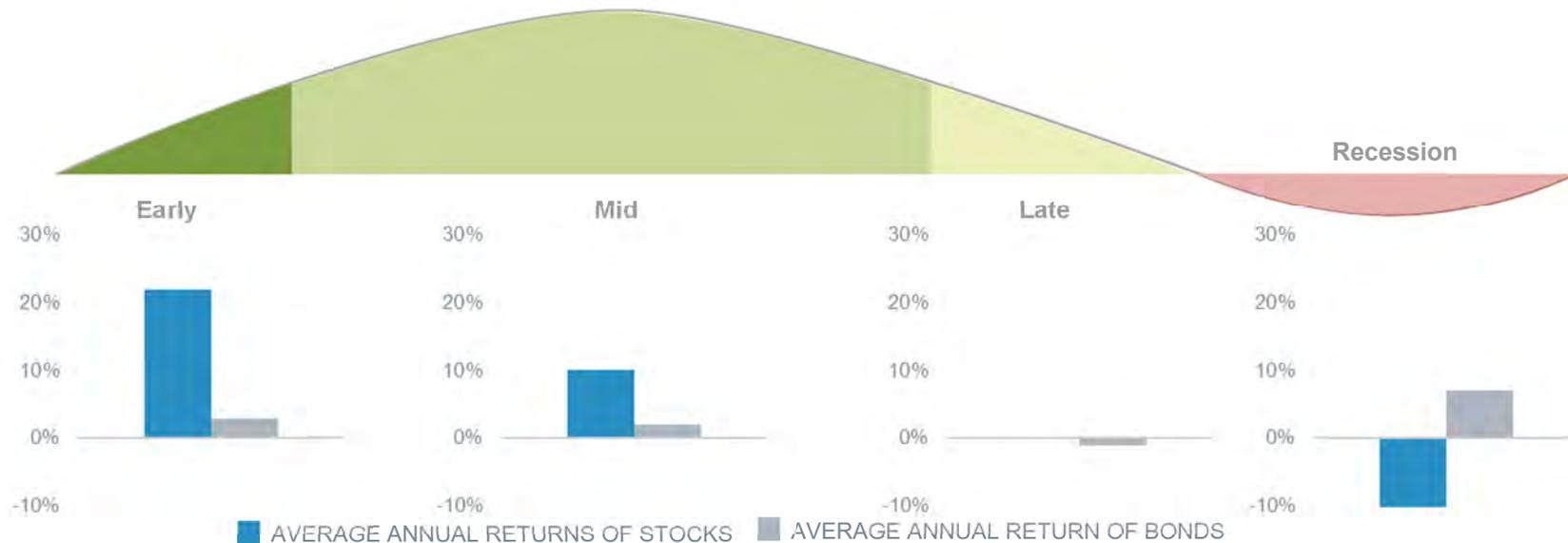
Business Cycle Investment Philosophy

Guiding principles of the Signaling Portfolio

ASSET CLASS RETURNS AND RISKS ARE INFLUENCED BY THE BUSINESS CYCLE

- Changes in corporate profitability, inventories, and credit availability drive the business cycle and overall economic outlook
- Asset prices reflect the changing outlook, affecting risk and return characteristics
- Proprietary business cycle models and indicators can signal changing business cycle regimes

STOCKS AND BONDS RETURNS BY CYCLE PHASE (1950–2013)

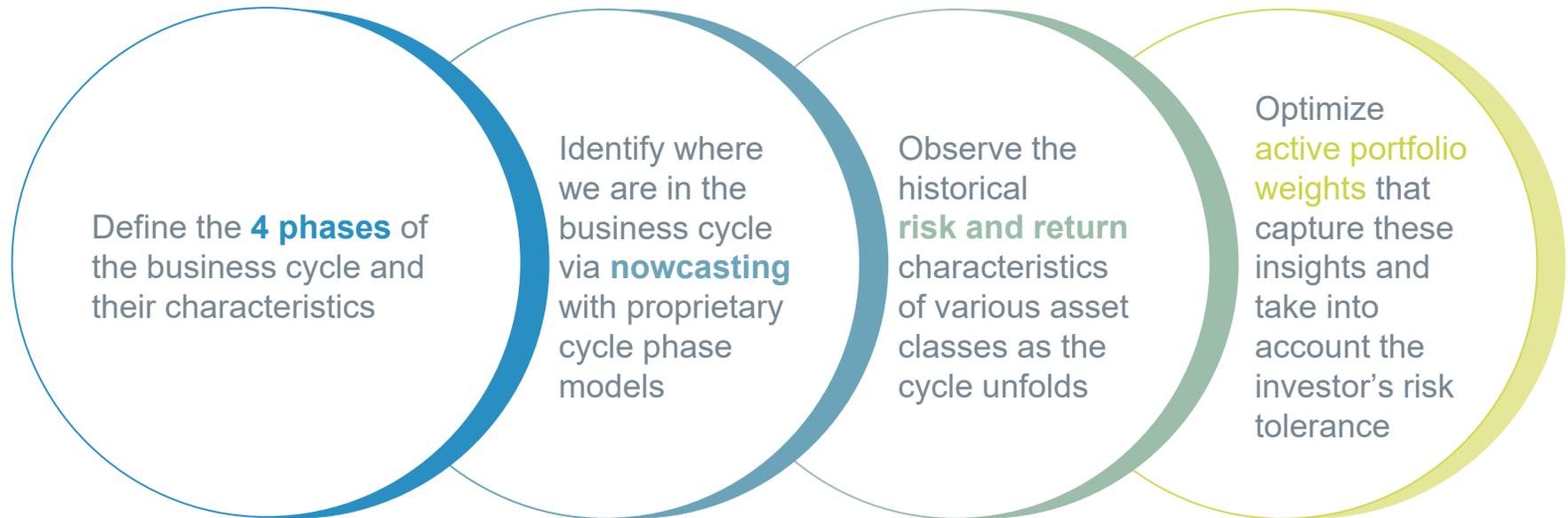


Past performance is no guarantee of future results. Asset class total returns are represented by indexes from the following sources: Fidelity Investments, Ibbotson Associates, Barclays. Source: Fidelity Investments proprietary analysis of historical asset class.

Source: Fidelity Investments (AART) as of 12/31/2020.

The diagram above is a hypothetical illustration of the business cycle. There is not always a chronological, linear progression among the phases of the business cycle, and there have been cycles when the economy has skipped a phase or retraced an earlier one. For illustrative purposes only.

Capturing the Insights of the Business Cycle Approach



Signaling Portfolio Investment Process

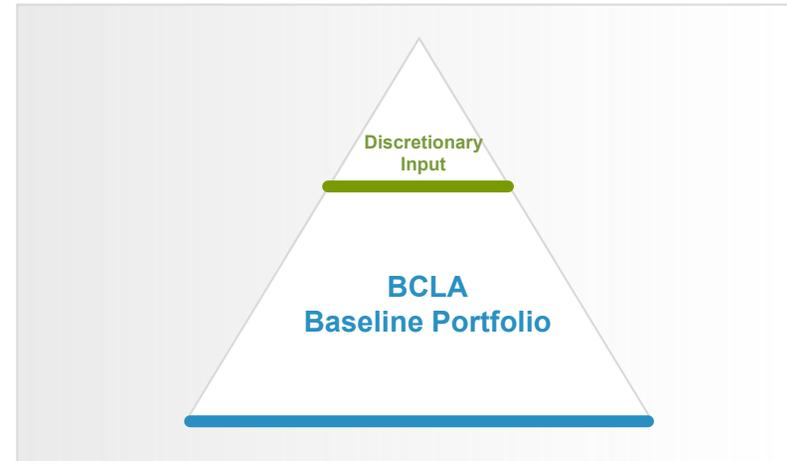
Portfolio Implementation

BCLA Baseline Portfolio

- Identify most likely business cycle phase
- Optimize active weights given risk parameters:
 - Asset class bands by cycle phase
 - cVaR constraints by cycle phase
 - Tracking error targets by cycle phase
- Output from this systematic quantitative process forms the BCLA Baseline Portfolio

Discretionary Input

- While history is a guide, every business cycle is different
- Experience and judgment complement the model baseline
- Key discretionary inputs include:
 - Cross Asset Value and Momentum models
 - Macro Research: China, Central Banks, geopolitical risk
 - Fundamental Research: 400+ Fidelity analysts and PMS



Portfolio Management and Trading

- Pre-trade risk analysis to ensure consistency with active risk targets
- Intermediate holding periods, except in late-to-recession and recession-to-early transitions
- Monthly index benchmark rebalancing and trading, subject to trade tolerance bands
- Hard-coded post-trade compliance testing
- Daily performance and compliance monitoring
- Full cycle performance evaluation via multi-asset class attribution system

For illustrative purposes only.

17 For Institutional Use Only.

202102-28500



Kaizen for the BCLA

Recent Enhancements

Kaizen, the Japanese term for “continuous improvement” or “change for the better” is a long-held cultural value at Fidelity.

In the vein of Kaizen, we have adopted several research enhancements that our macro team, AART, has been developing since this mandate was implemented in 2018.

- “Clusters.” Using a machine-learning technique, we identify portfolios that smooth the transition from early-to-mid and mid-to-late cycle
- Loss aversion adjustment. Analyzed the impact and reduced the penalty for loss aversion in the **BCLA** optimization
- Introduced enhanced historical return data set
- Added “robust control” to the optimization process to build additional resilience into the cycle portfolios

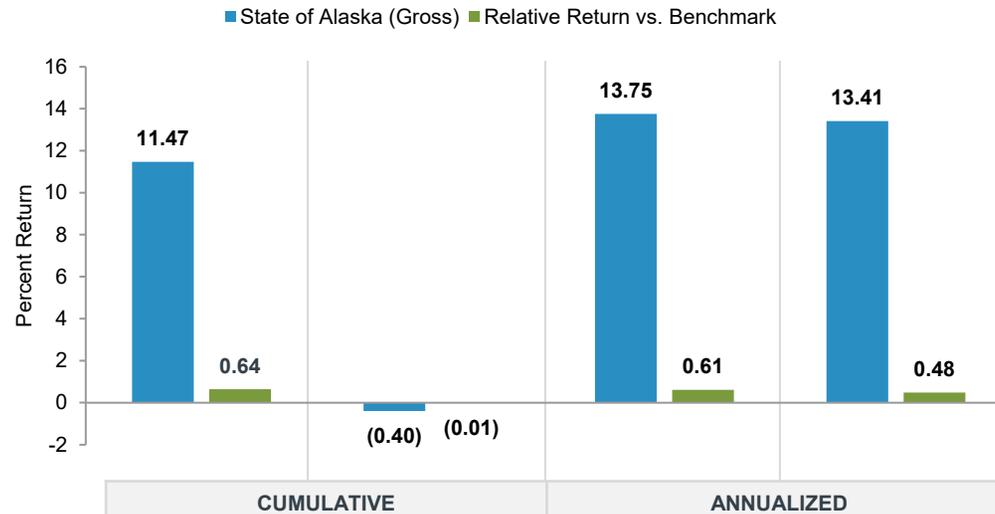
Performance

For Institutional Use Only.



Portfolio Performance (Gross)

As of January 31, 2021



	CUMULATIVE		ANNUALIZED	
	3-Month	YTD	1-Year	Since Inception
State of Alaska (Gross)	11.47	(0.40)	13.75	13.41
Custom Blended Benchmark*	10.83	(0.39)	13.14	12.93
<i>Relative Return vs. Benchmark (Gross)</i>	0.64	(0.01)	0.61	0.48

*Custom blended benchmark consists of 60% MSCI All Country World IMI and 40% Bloomberg Barclays Aggregate Bond Index.

Client data shown. Portfolio Inception Date: 10/31/18.

Performance data is shown gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

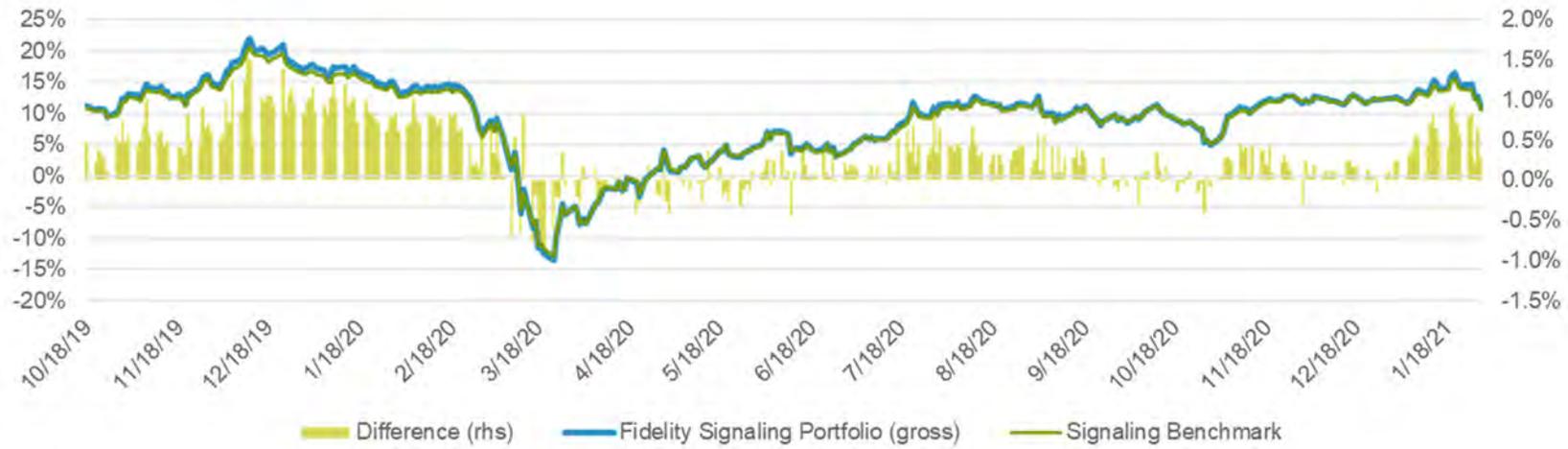
Past performance is no guarantee of future results.

Source: FIAM Performance Reporting Group.

Performance Scorecard/Rolling 1 Yr Chart

ROLLING 252 DAY GROSS OF FEES PERFORMANCE

NOVEMBER 1, 2018 – JANUARY 31, 2021



TRAILING 1 YEAR ATTRIBUTION THROUGH JANUARY 2021

	CONTRIBUTORS	DETRACTORS
ASSET ALLOCATION	<ul style="list-style-type: none"> Overweight Emerging Market Equities Underweight Core Bonds/positioning in Fixed Income 	<ul style="list-style-type: none"> Positioning in S&P 500 (under and then overweight)
MANAGER SELECTION	<ul style="list-style-type: none"> FIAM Broad Market Duration FIAM Select Emerging Markets 	<ul style="list-style-type: none"> FIAM SMID Cap strategy

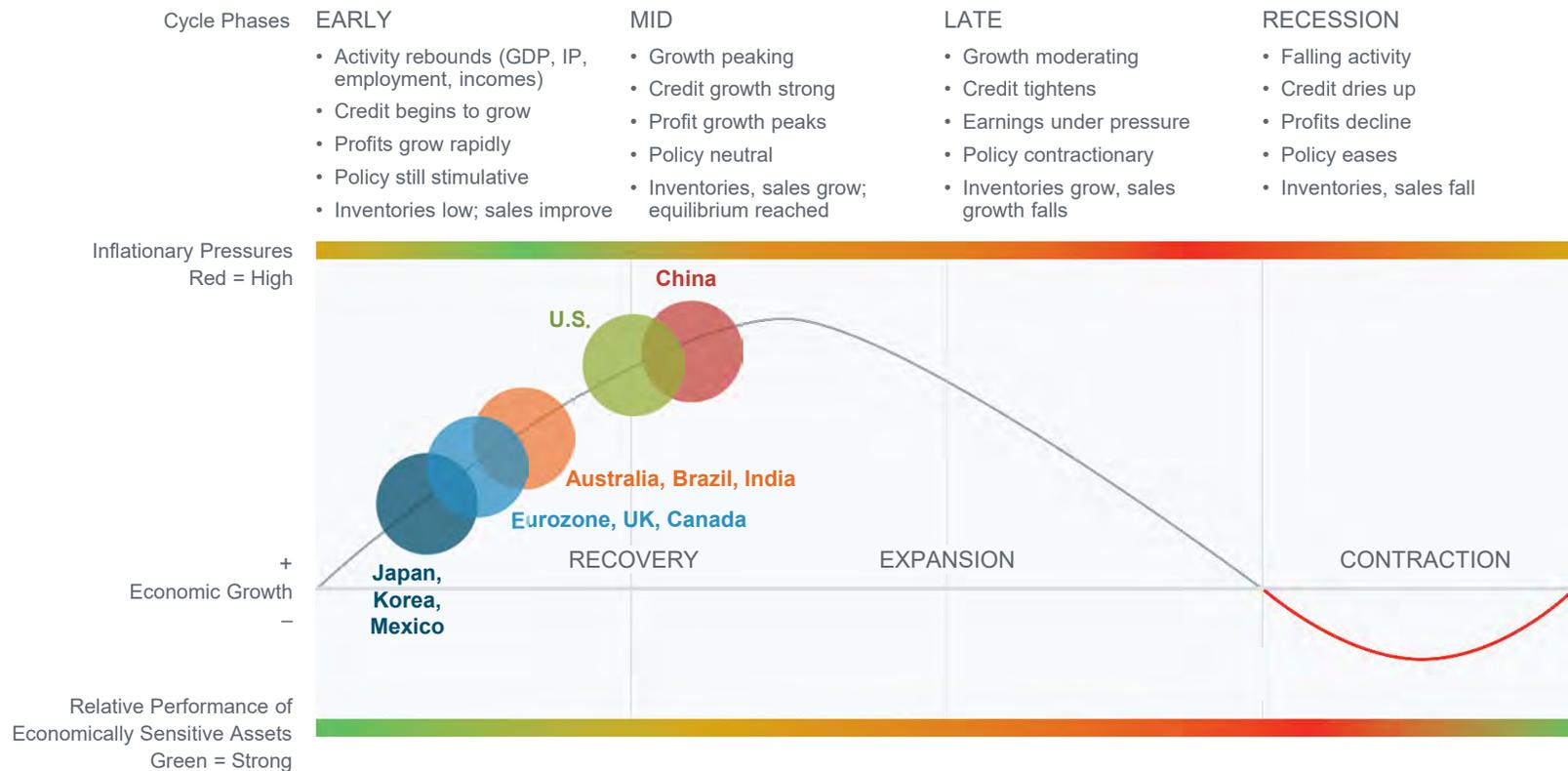
Client data shown. Performance data is generally presented gross of any fees and expenses, including advisory fees, which when deducted will reduce returns. Past performance is no guarantee of future results.

Capital Market Outlook

Global Business Cycle in a Maturing Recovery

The U.S. and most major economies enter 2021 in maturing recoveries. Some face near-term, virus-related headwinds, whereas China's progression is advanced due partly to its quicker emergence from lockdowns. Activity remains below 2019 levels in most countries, but the prospect of a vaccine-assisted full reopening over the coming year has us constructive on continued broadening of the global economic expansion.

BUSINESS CYCLE FRAMEWORK



Note: The diagram above is a hypothetical illustration of the business cycle. There is not always a chronological, linear progression among the phases of the business cycle, and there have been cycles when the economy has skipped a phase or retraced an earlier one.

Source: Fidelity Investments (AART), as of 12/31/20.

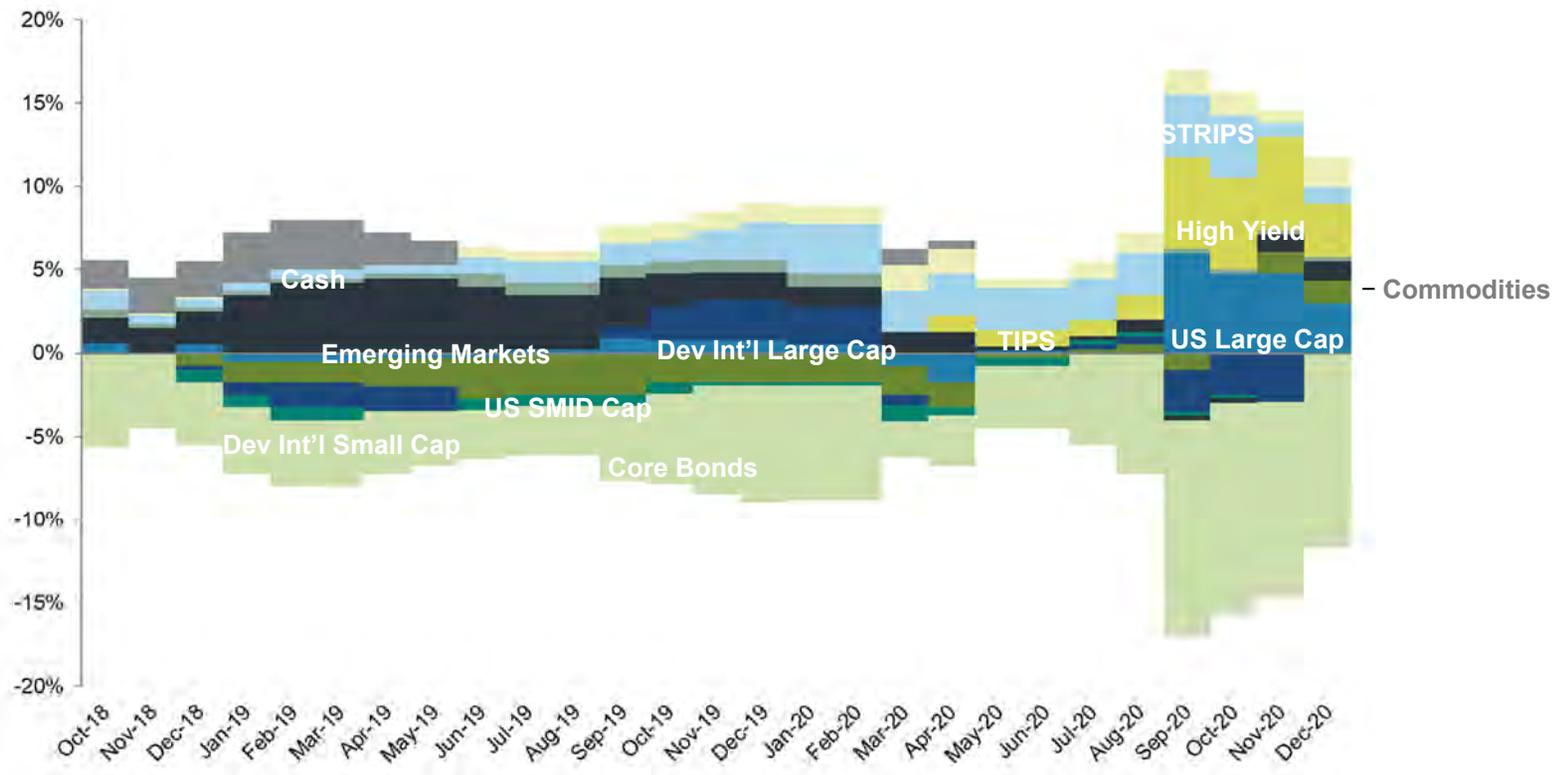
23 For Institutional Use Only.

202102-28500



Monthly Active Trading Targets

- As we move through the Business Cycle, the portfolio follows the BCLA process, which results in evolving levels of active tilts, active risk, and asset class emphasis
- Today, we are in **Mid Cycle**, which is constructive for risk assets and results in an overweight to equities across the globe



For illustrative purposes only.

24 For Institutional Use Only.

202102-28500



Outlook

Thinking about the 2020s, post-COVID

Fastest rebound ever

- Goods booming, shortages (e.g. semis for autos), shipping bottlenecks
- Housing booming – rates up, but mortgage rates hitting all time lows
- Migration booming – Southeast/TX
- Inequality

Mid cycle

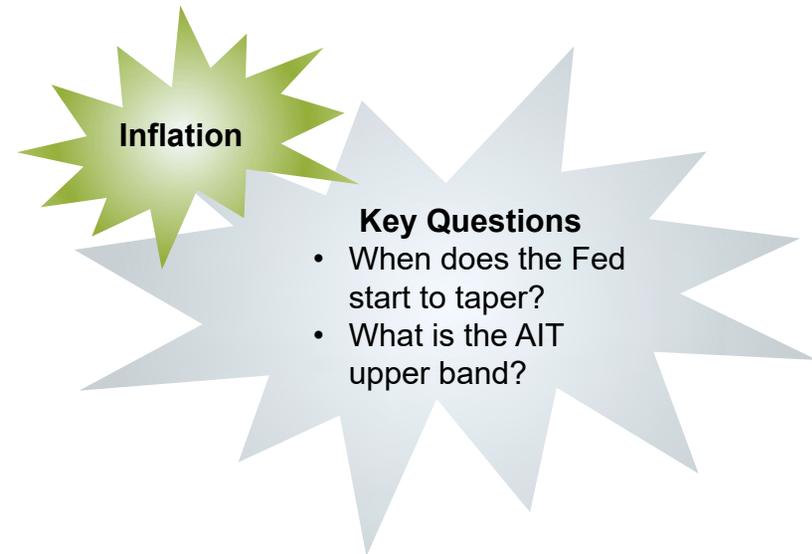
Monetary/Fiscal Policy, recent past and near future...

- Yellen + Powell Partnership
- Biden Stimulus
- Treasury General Account depletion

TINA/TRINA!!

The Ds!

- Debt
- De-Globalization
- Dollar
- De-Carbonization
- Democratization
 - GME Revolution



Appendix

Alaska Portfolio Holdings

Performance summary

	Cumulative		Annualized Returns				
	3-Month	1-Year	3-Year	5-Year	10-Year	Life of Fund	Inception Date
CAPITAL APPRECIATION							
Spartan 500 Equity Index (Gross)	14.05	17.23	11.70	---	---	14.84	06/30/2017
S&P 500	14.05	17.25	11.70	---	---	14.84	
<i>Relative Return (Gross)</i>	0.00	(0.02)	0.00	---	---	0.00	
Small/Mid Cap Core (Gross)	21.76	10.62	7.13	12.79	11.17	10.94	06/01/2001
Russell 2500	28.21	25.48	11.11	16.11	12.09	9.56	
<i>Relative Return (Gross)</i>	(6.45)	(14.86)	(3.98)	(3.32)	(0.92)	1.38	
Spartan Dev Intl Idx (Gross)	18.99	9.40	2.66	---	---	6.00	08/11/2017
MSCI World ex US (N)	19.30	8.54	2.29	---	---	5.62	
<i>Relative Return (Gross)</i>	(0.31)	0.86	0.37	---	---	0.38	
Select International Small Cap Gross)	21.87	21.91	4.95	11.95	9.63	11.49	12/21/2001
S&P EPAC Small Cap (N)	21.87	16.74	2.68	10.75	7.63	9.61	
<i>Relative Return (Gross)</i>	0.00	5.17	2.27	1.20	2.00	1.88	
Select Emerging Market Equity (Gross)	24.22	38.48	7.51	18.46	6.57	12.76	03/14/2014
MSCI Emerging Markets (N)	20.88	27.89	4.42	15.03	4.23	11.19	
<i>Relative Return (Gross)</i>	3.34	10.59	3.09	3.43	2.34	1.57	
Spartan Commodity Index (Gross)	11.44	7.27	(2.45)	---	---	0.38	07/14/2017
<i>BBG Commodity Ind TR</i>	11.51	7.31	(2.33)	---	---	0.52	
<i>Relative Return (Gross)</i>	(0.07)	(0.04)	(0.12)	---	---	(0.14)	

As of 1/31/21.

Client data shown.

Performance shown is gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

Past performance is no guarantee of future results.

Source: Fidelity Investments.

27 For Institutional Use Only.

202102-28500



Alaska Portfolio Holdings

Performance summary

	Cumulative		Annualized Returns				
	3-Month	1-Year	3-Year	5-Year	10-Year	Life of Fund	Inception Date
CAPITAL PRESERVATION							
Broad Market Duration (Gross)	1.73	7.79	6.81	5.47	4.75	6.07	12/20/1991
BBgBarc U.S. Agg Bond	0.40	4.72	5.49	4.00	3.75	5.53	
<i>Relative Return (Gross)</i>	1.33	3.07	1.32	1.47	1.00	0.54	
Intermediate Inflation Protected Index (Gross)							
BBgBarc 1-10 TIPS	2.67	7.56	5.38	3.96	2.80	3.19	10/01/2009
BBgBarc 1-10 TIPS	2.65	7.66	5.41	3.99	2.83	3.21	
<i>Relative Return (Gross)</i>	0.02	(0.10)	(0.03)	(0.03)	(0.03)	(0.02)	
US Long STRIPS (Gross)							
BBgBarc US STRIPS 25-30	(4.51)	6.13	12.77	8.21	---	7.82	01/03/2013
BBgBarc US STRIPS 25-30	(5.34)	6.51	12.80	8.28	---	8.05	
<i>Relative Return (Gross)</i>	0.83	(0.38)	(0.03)	(0.07)	---	(0.23)	
FIAM High Yield Pool – A (Gross)							
ICE BofA HYII Cons/HYII	4.68	3.59	4.91	7.86	6.04	8.10	5/31/1994
ICE BofA HYII Cons/HYII	6.40	6.48	5.76	8.85	6.43	7.45	
<i>Relative Return (Gross)</i>	(1.72)	(2.89)	(0.85)	(0.99)	(0.39)	0.65	
Institutional Cash (Gross)							
BBgBarc 3M T-Bill	0.05	0.56	1.74	1.48	0.90	1.48	06/30/2006
BBgBarc 3M T-Bill	0.03	0.55	1.58	1.22	0.65	1.15	
<i>Relative Return (Gross)</i>	0.02	0.01	0.16	0.26	0.25	0.33	

As of 1/31/21.

Client data shown.

Performance shown is gross of any fees and expenses, including advisory fees, which when deducted will reduce returns.

Past performance is no guarantee of future results.

Source: Fidelity Investments.

28 For Institutional Use Only.

202102-28500



Biographies

Catherine Pena, CFA

Portfolio Manager

Catherine Pena is a portfolio manager in the Global Asset Allocation (GAA) group at Fidelity Investments. Fidelity Investments is a leading provider of investment management, retirement planning, portfolio guidance, brokerage, benefits outsourcing, and other financial products and services to institutions, financial intermediaries, and individuals.

In this role, she manages multi-asset class portfolios for institutional clients and is directly involved in strategic asset allocation analysis, manager selection, portfolio construction, and tactical asset allocation.

Prior to assuming her current position in May 2013, Ms. Pena was the portfolio manager of Strategic Advisers Small-Mid Cap Fund and Strategic Advisers Small-Mid Cap Multi-Manager Fund. Previously, she held various other positions, including that of portfolio manager of various multi-asset class and multi-manager portfolios for clients of the Portfolio Advisory Services mutual fund wrap program, and research analyst/senior research analyst.

Before joining Fidelity in 1996, Ms. Pena worked as an analyst at Credit Suisse First Boston. She has been in the financial industry since 1995.

Ms. Pena earned her bachelor of science in business administration degree and her bachelor of arts degree in French from Xavier University, as well as her master of arts degree in economics from Southern Methodist University. She is also a CFA® charterholder.

Biographies

Kristin Shofner

Senior Vice President, Business Development

Kristin Shofner is senior vice president of business development at Fidelity Institutional Asset Management (FIAM), Fidelity Investments' distribution and client service organization dedicated to meeting the needs of consultants and institutional investors, such as defined benefit and defined contribution plans, endowments, and financial advisors.

In this role, Ms. Shofner leads the development of relationships with public pension plans.

Prior to joining Fidelity in 2013, Ms. Shofner served as director of institutional sales and marketing at Lord, Abbett & Co. LLC. Previously, she served as manager of institutional sales and client services and as a manager research associate at Asset Strategy Consulting, later acquired by InvestorForce. She has been in the financial industry since 1998.

Ms. Shofner earned her bachelor of arts degree in history and sociology from the University of California at Santa Barbara where she ran Division I Cross Country and Track & Field. She was also a member of our United States Ekiden Relay Team in China and ran in the US Olympic Trials Women's Steeplechase in Atlanta.

Important Information

Please read this information carefully. Speak with your relationship manager if you have any questions.

This document does not make an offer or solicitation to buy or sell any securities or services, and is not investment advice. FIAM does not provide legal or tax advice and we encourage you to consult your own lawyer, accountant, or other advisor before making an investment.

Information provided in this document is for informational and educational purposes only. To the extent any investment information in this material is deemed to be a recommendation, it is not meant to be impartial investment advice or advice in a fiduciary capacity and is not intended to be used as a primary basis for you or your client's investment decisions. Fidelity and its representatives may have a conflict of interest in the products or services mentioned in this material because they have a financial interest in, and receive compensation, directly or indirectly, in connection with the management, distribution and/or servicing of these products or services including Fidelity funds, certain third-party funds and products, and certain investment services.

Risks

Past performance is no guarantee of future results. Investors should be aware that an investment's value may be volatile and involves the risk that you may lose money. Performance for individual accounts will differ from performance for composites and representative accounts due to factors, including but not limited to, portfolio size, trading restrictions, account objectives and restrictions, and factors specific to a particular investment structure. Representative account information is based on an account in that strategy's composite that generally reflects that strategy's management and is not based on performance of that account.

The value of a strategy's investments will vary in response to many factors, including adverse issuer, political, regulatory, market, or economic developments. The value of an individual security or a particular type of security can be more volatile than and perform differently from the market as a whole. Nearly all accounts are subject to volatility in non-U.S. markets, either through direct exposure or indirect effects on U.S. markets from events abroad, including fluctuations in foreign currency exchange rates and, in the case of less developed markets, currency illiquidity. Events such as natural disasters, pandemics, epidemics, and social unrest in one country, region, or financial market may adversely impact issuers in a different country, region, or financial market. Performance could be negatively impacted if the value of a portfolio holding were harmed by such political or economic conditions or events. Moreover, such negative political and economic conditions and events could disrupt the processes necessary for investment operations.

The performance of fixed income strategies will change daily based on changes in interest rates and market conditions and in response to other economic, political, or financial developments. Debt securities are sensitive to changes in interest rates depending on their maturity, and may involve the risk that their prices may decline if interest rates rise or, conversely, if interest rates decline, their prices may increase. Debt securities carry the risk of default, prepayment risk, and inflation risk. Changes specific to an issuer, such as its financial condition or its economic environment, can affect the credit quality or value of an issuer's securities. Lower-quality debt securities (those of less than investment-grade quality, also referred to as high-yield debt securities) and certain types of other securities are more volatile, speculative and involve greater risk due to increased sensitivity to adverse issuer, political, regulatory, and market developments, especially in periods of general economic difficulty. The value of mortgage securities may change due to shifts in the market's perception of issuers and changes in interest rates, regulatory, or tax changes.

Derivatives may be volatile and involve significant risk, such as credit risk, currency risk, leverage risk, counterparty risk, and liquidity risk. Using derivatives can disproportionately increase losses and reduce opportunities for gains in certain circumstances.

These materials contain statements that are "forward-looking statements," which are based on certain assumptions of future events. FIAM does not assume any duty to update any forward-looking statement. Actual events may differ from those assumed. There can be no assurance that forward-looking statements, including any projected returns, will materialize or that actual market conditions and/or performance results will not be materially different or worse than those presented.

Important Information, continued

Performance Data

Unless otherwise indicated performance data shown is client data. Performance data is generally presented gross of any fees and expenses, including advisory fees, which when deducted will reduce returns. All results reflect realized and unrealized appreciation and the reinvestment of dividends and investment income, if applicable. Taxes have not been deducted.

FIAM claims compliance with the Global Investment Performance Standards (GIPS®). In conducting its investment advisory activities, FIAM utilizes certain assets, resources and investment personnel of Fidelity Management & Research Company LLC and its affiliates, which do not claim compliance with GIPS®. Performance for individual accounts will differ from performance for composites and representative accounts due to factors, including but not limited to, portfolio size, trading restrictions, account objectives and restrictions, and factors specific to a particular investment structure. If representative account information is shown, it is based on an account in the subject strategy's composite that generally reflects that strategy's management and is not based on performance.

*

*

*

*

Fidelity Institutional Asset Management (FIAM) includes the following entities or divisions that provide investment services: Fidelity Institutional Asset Management Trust Company, a New Hampshire trust company (FIAM TC); FIAM LLC, a U.S. registered investment adviser; the Fidelity Institutional Asset Management division of FMR Investment Management (UK) Limited, a UK registered investment manager and U.S. registered investment adviser; and the Fidelity Institutional Asset Management division of Fidelity Management & Research (Hong Kong) Limited, a Hong Kong and U.S. registered investment adviser. Fidelity Asset Management Solutions (FAMS) provides a broad array of investment solutions with its Global Institutional Solutions (GIS), Global Asset Allocation (GAA), and institutional equity, fixed income, high income, and alternative asset management teams through FIAM LLC and Fidelity Institutional Asset Management Trust Company.

"Fidelity Investments" and/or "Fidelity" refers collectively to FMR LLC, a U.S. company, and its subsidiaries, including but not limited to Fidelity Management & Research Company LLC (FMR) and FIAM LLC.

Certain data and other information in this presentation have been supplied by outside sources and are believed to be reliable and current. Data and information from third-party databases, such as eVestment Alliance, Callan, and Morningstar are self-reported by firms that generally pay a subscription fee to use such databases, and the database sponsors do not guarantee or audit the accuracy, timeliness, or completeness of the data and information provided, including any rankings. Rankings or similar data reflect information at the time rankings were retrieved from a third-party database, and such rankings may vary significantly as additional data from managers is reported. Rankings may include a variety of product structures, including some in which certain clients may not be eligible to invest. FIAM cannot verify the accuracy of information from outside sources, and potential investors should be aware that such information is subject to change without notice.

Third-party trademarks and service marks are the property of their respective owners. All other trademarks and service marks are the property of FMR LLC or its affiliated companies.

Not FDIC Insured • No Bank Guarantee • May Lose Value



968392.1.0
FIAM-IA
EXPIRES 3/22/21

© 2021 FMR LLC. All rights reserved.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Fidelity Signaling Benchmark Change ACTION: X
and Portfolio Enhancements

DATE: March 18-19, 2021 INFORMATION: _____

BACKGROUND

Fidelity was hired by the Alaska Retirement Management Board (ARMB) in 2018 to invest in a global multi asset strategy. The strategy is based on the expectation that the stage of the business cycle drives asset class performance and risk characteristics. Overall portfolio risk and allocation to asset classes is adjusted over time based on business cycle assessment. The objective is to deliver 55 to 65 basis points of excess returns over a full market cycle.

The benchmark is 60% MSCI ACWI IMI and 40% Bloomberg Barclays US Aggregate. The Fidelity Signaling portfolio is in ARMB's Opportunistic Asset Class. The portfolio is composed of underlying funds in the following building block portfolios: U.S. Equity, Developed Non-U.S. Equity, Emerging Market Equity, U.S. High Yield, U.S. Core Bonds, U.S. Long STRIPS, U.S. TIPS, Commodities, and Cash.

STATUS

Portfolio Building Blocks

Fidelity has made several enhancements to their investment process since inception of the strategy. These include modifying the behavioral loss factor, tuning the optimization parameters around cVaR levels and asset class bands, and refining how the data is organized into clusters for more precise analysis of business cycle phase. As part of this portfolio improvement process, Staff supports Fidelity's request to add the following building blocks to the ARMB portfolio's opportunity set:

U.S. Equity - FIAM Small Capitalization Core Commingled Pool
REITs - FIAM REIT Commingled Pool

These additions are both actively managed and are expected to improve diversification and expected return of the overall portfolio. No change in fees will result in the addition of these component portfolios.

Benchmark

For Fiscal Year 2021, the PERS, TRS, and JRS the risk/return profile of its asset allocation is modestly in excess of a 70% equity/30% bond portfolio.

Fidelity is comfortable increasing the risk posture from 60% equity/40% bonds to 70% equity/30% bonds and staff expects this to be better aligned with the overall objectives of the ARMB's portfolio.

	FY21 PERS	60/40	70/30
Expected Return	7.13%	6.27%	6.65%
Standard Deviation	13.55%	10.85%	12.65%

In the aggregate, both the building block additions and the overall risk profile change will better align the Fidelity portfolio with ARMB's overall risk posture and increase excess return expectations from 55 – 65 to 75 – 85 annualized basis points and increase tracking error from 125 – 175 to 125 – 225 basis points.

RECOMMENDATION

The ARMB authorize staff to make the necessary changes to the Fidelity Signaling investment guidelines to change the benchmark to 70% MSCI ACWI IMI and 30% Bloomberg Barclays US Aggregate index and add REIT and Small Cap building blocks to the portfolio opportunity set.

Baillie Gifford Overseas Ltd.

Relevant Mandates: International Equity

Hired: 2014

Firm Information	Investment Approach	Total ARMB Mandate				
<p>Baillie Gifford & Co is a wholly-owned Scottish partnership, owned by 47 partners who all work within the firm. It is a private partnership with unlimited liability. The firm was set up in 1908 and predominantly managed listed investment trusts, but over time diversified into managing funds for corporate and public pension funds (both defined benefit and defined contribution), charities, endowments, family trusts and other financial institutions.</p> <p>The partnership has four 100% owned subsidiaries. All four are private limited companies registered in Scotland. It also has three indirectly owned 100% subsidiaries through Baillie Gifford Overseas Limited, as well as one joint venture through Baillie Gifford Overseas Limited.</p> <p>As of 12/31/2020, the firm's total assets under management and advisement were \$370.4 billion.</p> <p>Key Executives: Andrew Telfer, <i>Joint Senior Partner (Business)</i> Charles Plowden, <i>Joint Senior Partner (Investments)</i> Joe Faraday, <i>Investment Manager</i> Gerard Callahan, <i>Investment Manager</i> Iain Campbell, <i>Investment Manager</i> Sophie Ernsshaw, <i>Investment Manager</i> Moritz Sitte, <i>Investment Manager</i> Eoin Anderson, <i>Client Service Manager</i></p>	<p>Baillie Gifford is a bottom-up, growth oriented, long-term investor, running concentrated portfolios with relatively low turnover. They aim to add value through the use of proprietary, fundamental research, which prioritizes the selection of individually attractive companies, with an emphasis on deploying capital for growth, rather than taking top-down industry bets. Portfolios are managed by a team of professionals with an emphasis on diversity within the team.</p> <p>Benchmark: MSCI ACWI ex-US Growth</p>	<p>Assets Under Management:</p> <table> <tr> <td>Defined Benefit 12/31/2020</td> <td style="text-align: right;">\$316,422,721</td> </tr> <tr> <td>Defined Contribution 12/31/2020</td> <td style="text-align: right;">\$134,608,850</td> </tr> </table>	Defined Benefit 12/31/2020	\$316,422,721	Defined Contribution 12/31/2020	\$134,608,850
Defined Benefit 12/31/2020	\$316,422,721					
Defined Contribution 12/31/2020	\$134,608,850					

Concerns: None

12/31/2020 Performance

	<u>Last Quarter</u>	<u>1-Year</u>	<u>3-Years Annualized</u>	<u>5-Years Annualized</u>	<u>6-Years Annualized</u>
Baillie Gifford (gross)	17.01%	33.87%	14.58%	15.06%	12.87%
Baillie Gifford (net)	16.89%	33.29%	14.08%	14.56%	12.38%
MSCI ACWI ex-US Growth	13.92%	22.20%	10.02%	11.97%	9.65%

STATE OF ALASKA RETIREMENT AND BENEFITS PLANS

Gerard Callahan and Eoin Anderson, March 2021



Where Baillie Gifford pooled funds are held, please note the fund portfolio information contained within this report is confidential, proprietary information and should be maintained as such and not disseminated. The content is intended for information purposes only and should not be disclosed to other third parties or used for the purposes of market timing or seeking to gain an unfair advantage.

Speaker Biographies

Gerard Callahan



Gerard joined Baillie Gifford in 1991 and is head of our UK Equity Team and Chairman of the International All Cap Portfolio Construction Group. He became a Partner of the firm in 2000. Gerard has been involved as a Portfolio Manager in our International strategies since 1998. He graduated BA in Politics, Philosophy and Economics from the University of Oxford in 1991.

Eoin Anderson



Eoin is a Client Service Director in the Clients Department. He joined Baillie Gifford in 2007. Eoin graduated BA (Hons) in Economics from The University of Stirling in 2005 and gained a Postgraduate Diploma in Economics from The University of Edinburgh in 2007.

BREXIT



Brexit – 47 Years in the Making

January 1973 – UK joins European Economic Community (EEC)

First Referendum by 1975! (change of UK Government in 1974)

Europe issue had dogged UK politics since:

— 1970s/80s

— objections from across the UK political spectrum

— 1990s/00s

— Maastricht Treaty ('ever closer Union' ...from economic to political union)

— £ ERM exit in 1992

— Euro single currency from 1999 (UK opts out)

— 2000s

— Growing "Euroscepticism" (UKIP etc.)

2015 – Conservative Election pledge: reform and Yes/No vote

2016 – Referendum – 52/48% for 'Leave'

Recent History

**Three years of political shambles post Brexit vote
(Minority Government since 2017)**

2019 Election – Boris Johnson and “Get Brexit Done”

January 2020 – UK leaves the EU after 47 years

11 month “transition period” to negotiate “deal”

Then Covid-19 came along...

EU/UK Trade Deal agreed late December 2020



© Getty Images News

Short Term Impact

Pound sterling fell 10% on the Vote, not much change since

Difficult to disentangle Economic impact 2016-19 (UK dull (1-2% growth) but not as bad as many predicted)

2020 Covid impact (UK GDP ↓ 10%) – any Brexit impact is guesswork

Trade Deal in late 2020 averts chaotic outcome

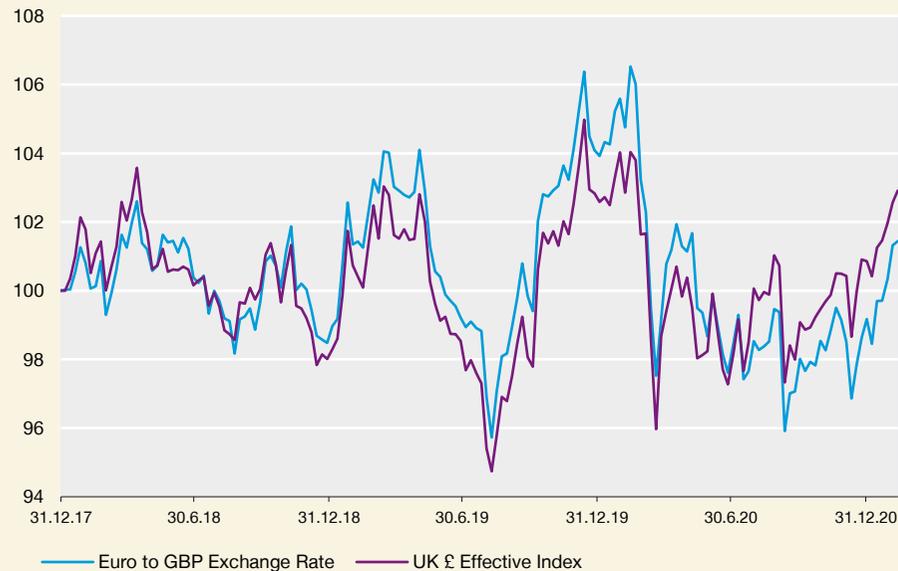
— Extensive no tariff / no quotas Trade Deal with EU

— Says very little on Services (80% of UK economy) – still much to be sorted



Image source: © 2016 Bloomberg Finance LP.

Impact on Asset Classes



Source: Eikon data from Refinitiv. Data to February 12, 2021.



Pound sterling ↓10% on 2016 Vote – broadly stable since

UK stock market lags AC World ex US in 2020

But is this Brexit related?

- Mega Cap oils / international banks suffered most in post Covid markets
- No sign of distress in currency markets

Impact to date is unclear

Looking ahead

- Economic impact depends on behavioural response from businesses and consumers
- Be wary of spurious economic models, especially with major Covid distortions
- Profound cultural and societal impact of Brexit will take years to measure (if it can be done at all)

Your Portfolio (circa.10% UK Stocks)

We are 'bottom up', long term stock pickers – not trading around political events

UK stock market ≠ UK Economy (70%+ International)

We have some domestic names (Auto Trader, Rightmove, Hargreaves Lansdown) but very little UK economic sensitivity

Not expecting Brexit to be a material factor in our investment outcomes

Concluding Musings

Is that it?... What was all the fuss about!

Difficult to disentangle any immediate Brexit induced economic impact (especially during pandemic), or identify discernible causal shifts within investment asset classes

But these important political events still have long lasting consequences:

- We don't yet know the scale / cost / impact of longer-term non-tariff European trade barriers
- What are the long term societal / cultural consequences of separation of UK from EU
(narrow minded UK nationalism; or a liberating energetic re-set of the UK's place in the world?)
- Scottish independence and the break-up of the UK? (62% against Brexit; IndyRef 2?)

Consequences matter... we just don't know what they are yet

PORTFOLIO UPDATE



Relationship with Baillie Gifford

Appointment

- Appointed in July 2014 to manage a \$200m portfolio for Retirement and Benefit Plans
- Appointed in August 2018 to manage an \$85m portfolio for Defined Contribution Plans
- Benchmarked against the MSCI AC World ex US Growth Index

Valuations as at December 31, 2020

- State of Alaska Retirement and Benefit Plans - \$315,999,473
- Alaska Retirement Management Board Defined Contribution Plans - \$127,503,034

Objective

- To exceed the rate of return, over time, of the MSCI AC World ex US Growth Index, net of fees

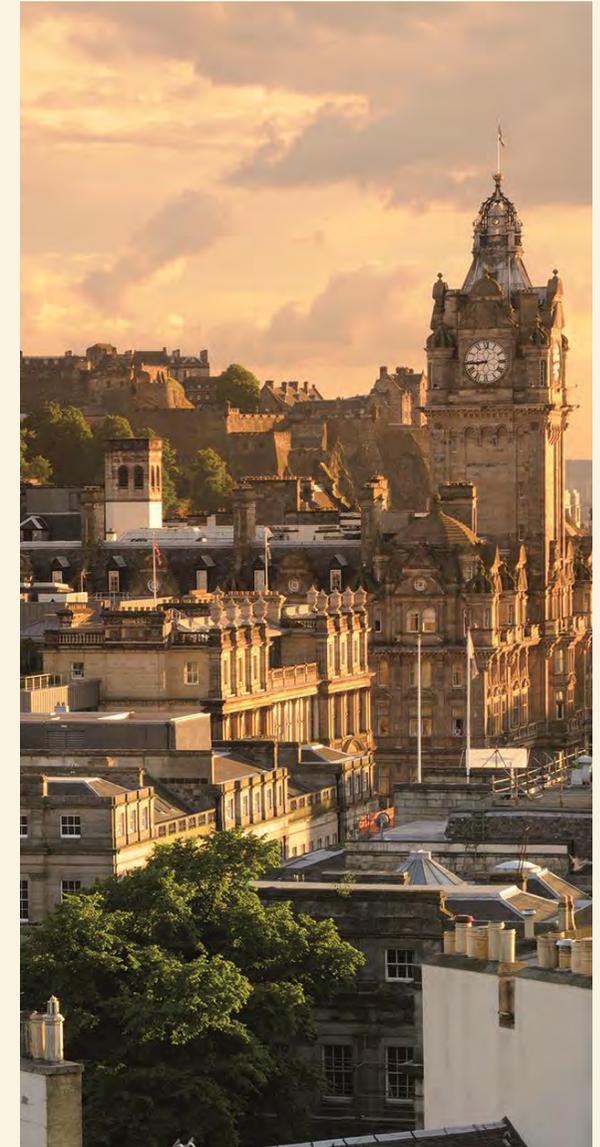
Baillie Gifford Update

	December 31, 2019	December 31, 2020
Number of Clients	706	714
Number of Staff	1,285	1,394
Number of Investment Professionals	271	293
Funds Under Management	\$289.6bn	\$445.3bn
Number of International All Cap Clients	54	56
International All Cap Funds Under Management	\$19.7bn	\$25.6bn

US dollar.

Baillie Gifford - Long-established asset management partnership

- Stability: organic growth since 1908
- Autonomy: owned by 46 partners working within the firm
- Sole focus: investment management
- Bottom-up growth investing



Investment Philosophy

Growth

— Superior profit growth leads to outperformance in the long run

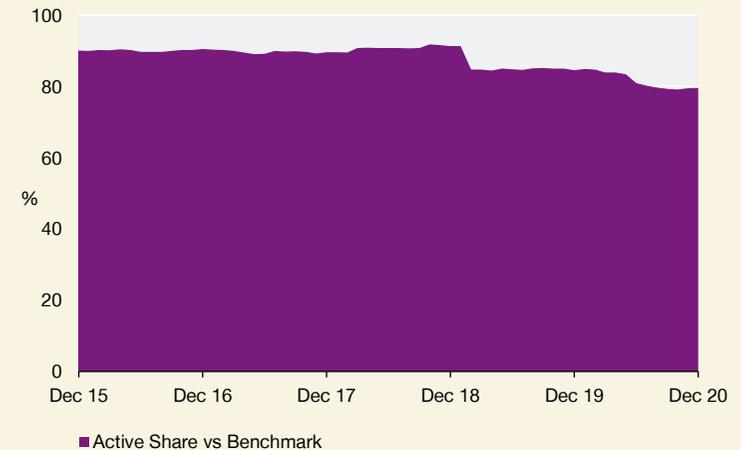
Bottom-up stock selection

— Fundamental analysis enables exploitation of market inefficiencies

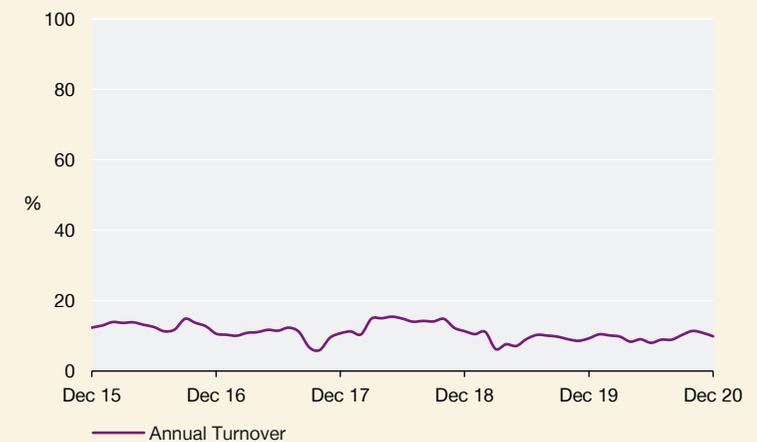
Long-term perspective

— Share prices reflect fundamentals over the long term

Active Share



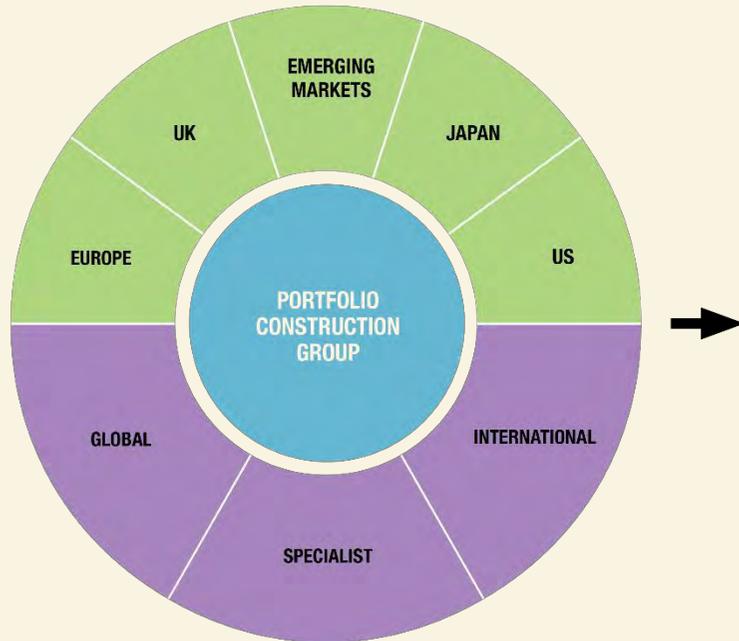
Turnover



Source: Baillie Gifford & Co, MSCI.
Benchmark: MSCI AC World ex US until January 2019, MSCI AC World ex US Growth thereafter.
Based on State of Alaska Retirement and Benefit Plans.

Investment Process

Firm-wide Discovery 129 Investment Analysts



Portfolio Construction Group



Gerard Callahan*

29 years' experience
29 years with
Baillie Gifford



Iain Campbell*

16 years' experience
16 years with
Baillie Gifford



Sophie Earnshaw

10 years' experience
10 years with
Baillie Gifford



Joe Faraday

18 years' experience
18 years with
Baillie Gifford



Moritz Sitte

10 years' experience
10 years with
Baillie Gifford

International All Cap PCG members embedded in our regional teams

Four Specialist representatives strengthening links across the investment floor



Julia Angeles

12 years' experience
12 years with
Baillie Gifford



Charlie Broughton

6 years' experience
6 years with
Baillie Gifford



Kate Fox*

18 years' experience
18 years with
Baillie Gifford



Svetlana Viteva

8 years' experience
8 years with
Baillie Gifford

*Partner

Best ideas from firm-wide research: PCG ownership and accountability

The Portfolio

22%		20%		26%		20%	
>10 YEARS		5-10 YEARS		2-5 YEARS		<2 YEARS	
Holding	% Holding	Holding	% Holding	Holding	% Holding	Holding	% Holding
TSMC	3.8	Zalando	2.5	Shopify ⊖	3.5	Systemx	1.7
Mettler-Toledo	1.6	Alibaba	2.1	ASML	2.2	Meituan Dianping NB	1.6
Atlas Copco	1.6	Tsingtao Brewery ⊖	1.5	Bechtle	1.9	MercadoLibre NB	1.5
Rightmove	1.5	Auto Trader ⊕	1.3	Asian Paints	1.7	Xero	1.5
Olympus	1.5	Shiseido	1.2	Nidec Corporation	1.7	NIBE	1.4
SMC	1.5	Hargreaves Lansdown	1.2	Sartorius Group ⊖	1.6	Techtronic Industries	1.3
Naspers	1.4	Richemont	1.2	Murata Manufacturing	1.5	Remy Cointreau NB	1.2
adidas	1.2	Inditex	1.1	Spotify	1.5	Li Ning NB	1.2
Cochlear ⊕	1.2	Shimano	1.1	AIA	1.5	LVMH NB	1.0
Kone	1.1	SEEK	1.0	HDFC	1.4	Ubisoft Entertainment NB	0.9
United Overseas Bank	1.0	Jeronimo Martins	0.8	Keyence	1.2	Trainline	0.9
Investor	0.9	Kakaku.com	0.7	Kingspan Group	1.1	Kering NB	0.9
Baidu.com	0.9	Jardine Matheson	0.7	SoftBank Group	1.0	Rational NB	0.9
Intertek	0.9	DENSO	0.6	Raia Drogasil	0.9	Suzuki Motor ⊕	0.8
Kao	0.6	Burberry	0.6	Epiroc ⊖	0.9	Ping An Insurance	0.8
ASOS ⊕	0.6	Weir	0.6	NAVER Corp	0.7	Prosus	0.7
Johnson Matthey	0.6	Trip.com Group	0.5	Pigeon	0.6	CATL NB	0.6
Walmex	0.4	Treasury Wine Estates	0.4	HomeServe	0.5	Nemetschek	0.6
Wood Group	0.3	Sugi Holdings	0.4	Fairfax Financial	0.4	ICICI Lombard NB	0.5
		Thai Beverage	0.3	United Spirits	0.4		
		Jardine Strategic	0.1	MakeMyTrip	0.3		

Complete Sales

Legrand	Novozymes	Jupiter Fund Management	Infineon	u-blox
MS&AD Insurance	Schindler	Mahindra & Mahindra	Public Bank	

As at December 31, 2020. Totals may not sum due to rounding. Cash: 11.3%.

Holding weights based on the State of Alaska Retirement and Benefits Plans. Holding periods based on representative ACWI ex US All Cap portfolios.

Notable transactions shown 12 Months to December 31, 2020. NB New Buy ⊕ Addition ⊖ Reduction.

Notable Transactions

CATL

The dominant leader of power battery systems in China



China's desire to have a global/national champion in this field
 High market share (40+%) in China
 Potential for significant growth overseas

Image source: © Imaginechina Limited/Alamy Stock Photo

Rational

Combi-Ovens and Cooking Equipment



Strong growth of automation in the commercial kitchen (iCombi and iVario product lines)
 Quality business - high returns (60% ex cash ROCE) and margins (60% gross)
 A concentration on customer service and long-term focused management (the Meitser family)

Image source: © Rational AG

MercadoLibre

LatAM's largest e-commerce business



Rapidly growing ecommerce and online payments leader
 Strong industry growth tailwinds
 Ability to add business adjacencies with time (payments, supply chain, web hosting)

Image source: © Newscast/REX/Shutterstock

Notable transactions shown 12 months to December 31, 2020.

NB New Buy

Performance

Fund Performance to December 31, 2020

	Fund (Net) %	Benchmark %	Difference %
Alaska Retirement and Benefits Plans Since Inception* (p.a.)	10.5	7.2	+3.3
Alaska Retirement Management Board DC Plan Since Inception** (p.a.)	17.3	13.3	+4.0
Five Years (p.a.)	14.6	12.3	+2.2
Three Years (p.a.)	14.0	10.0	+4.0
12 Months	33.1	22.6	+10.6
Three Months	16.9	14.0	+2.9

Top and Bottom Five Relative Stock Contributors 12 Months to December 31, 2020

Name	Average Fund Weight %	Contribution %
Shopify	3.7	2.7
Zalando	2.2	1.3
Sartorius Group	2.1	1.0
Spotify	1.4	0.8
Xero	1.2	0.6
Hargreaves Lansdown	1.7	-0.6
Tencent†	0.0	-0.6
Treasury Wine Estates	0.6	-0.4
Raia Drogasil	1.2	-0.4
Cochlear	1.6	-0.4

Top and Bottom Five Relative Stock Contributors Three Years to December 31, 2020

Name	Average Fund Weight %	Contribution %
Shopify	2.3	4.4
Sartorius Group	1.7	1.7
Zalando	1.9	1.1
Bechtle	1.2	1.0
TSMC	2.9	0.8
JD.com††	0.7	-0.7
Jupiter Fund Management††	0.6	-0.6
Suruga Bank††	0.1	-0.6
Mahindra & Mahindra††	0.7	-0.6
Hargreaves Lansdown	2.2	-0.6

Source: StatPro, MSCI. Net of fees. Totals may not sum due to rounding. Based on the State of Alaska Retirement and Benefit Plans. Benchmark: MSCI AC World ex US index between 07/31/2014 and 08/01/2018, MSCI AC World ex US Growth index thereafter.

*July 31, 2014. **August 1, 2018

†Not held during the period. ††Sold during the period.

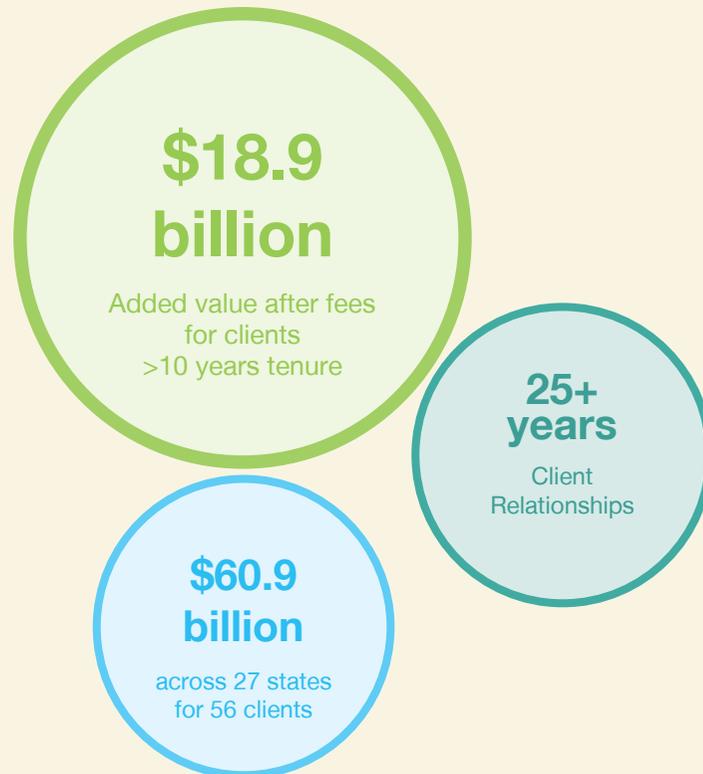
All investment strategies have the potential for profit and loss. Past performance is not a guide to future returns.

APPENDICES



US Public Plan Clients

First US public plan client in 1993



Representative Client List

Arkansas Public Employees Retirement System
California Public Employees' Retirement System
California State Teachers
Colorado Public Employees' Retirement Association
Indiana Public Retirement System
Kansas Public Employees Retirement System
Maryland State Retirement Agency
Massachusetts Pension Reserves Investment Management Board
New York City Deferred Compensation Plan
Oklahoma Public Employees Retirement System
Pennsylvania Public School Employees' Retirement System
State Board of Administration of Florida
The Public Employees' Retirement System of Mississippi
Virginia Retirement System

Industry Memberships

National Association of State Retirement Administrators
National Council on Teacher Retirement
National Institute on Retirement Security
National Conference on Public Employee Retirement Systems
The Council of Institutional Investors
United Nations Principles for Responsible Investment

As of December 31, 2020. US dollars.

The clients identified in the above list were selected based on a variety of factors, including name recognition, industry, geographic region and investment mandate. The selection of clients for the list is not based on performance criteria. It is not known whether the listed clients approve or disapprove of Baillie Gifford or services provided.

An important and valued part of our business

International All Cap Portfolio Construction Group Biographies



Gerard Callahan

29 years' experience

29 years with Baillie Gifford

Gerard joined Baillie Gifford in 1991 and is head of our UK Equity Team and Chairman of the International All Cap Portfolio Construction Group. He became a Partner of the firm in 2000 and lead manager of our UK Alpha Strategy in the same year. Gerard has been involved as a Portfolio Manager in our International strategies since 1998, initially in selecting UK stocks. He graduated BA in Politics, Philosophy and Economics from the University of Oxford in 1991.



Iain Campbell

16 years' experience

16 years with Baillie Gifford

Iain joined Baillie Gifford in 2004 and has been a member of the International All Cap Portfolio Construction Group since 2010. Prior to joining Baillie Gifford, he worked for Goldman Sachs as an analyst in the Investment Banking division. Iain graduated BA in Modern History from the University of Oxford in 2000.



Sophie Earnshaw

10 years' experience

10 years with Baillie Gifford

Sophie joined Baillie Gifford in 2010. She is a CFA Charterholder and has been a member of the International All Cap Portfolio Construction Group since 2014. She graduated MA in English Literature from the University of Edinburgh in 2008 and MPhil in Eighteenth Century and Romantic Literature from the University of Cambridge in 2009.



Joe Faraday

18 years' experience

18 years with Baillie Gifford

Joe joined Baillie Gifford in 2002 and has been a member of the International All Cap Portfolio Construction Group since 2007. He graduated MEng in Chemical Engineering from the University of Cambridge in 2002 and gained an MBA from the University of Edinburgh in 2009. Joe is also a CFA Charterholder.



Moritz Sitte

10 years' experience

10 years with Baillie Gifford

Moritz joined Baillie Gifford in 2010 and has been a member of the International All Cap Portfolio Construction Group since 2014. He graduated BSc in Business Administration from the University of Regensburg, Germany in 2009 and MSc in Finance and Investment from the University of Edinburgh in 2010. Moritz is a CFA Charterholder.

Discrete Performance

Alaska Retirement and Benefits Plans

	12/31/15- 12/31/16	12/31/16- 12/31/17	12/31/17- 12/31/18	12/31/18- 12/31/19	12/31/19- 12/31/20
Fund Net %	0.9	31.9	-16.6	33.8	33.1
Benchmark %	5.0	27.8	-14.9	27.8	22.6

Alaska Retirement Management Board Defined Contribution Plans

	12/31/15- 12/31/16	12/31/16- 12/31/17	12/31/17- 12/31/18	12/31/18- 12/31/19	12/31/19- 12/31/20
Fund Net %	N/A	N/A	N/A	34.0	33.5
Benchmark %	N/A	N/A	N/A	27.8	22.6

Source: StatPro, MSCI.
Benchmark: MSCI AC World ex US Growth index.

Legal Notices

All information is current and sourced from Baillie Gifford & Co unless otherwise stated.

Contracting Entity

Baillie Gifford Overseas Limited

MSCI

Source: MSCI. The MSCI information may only be used for your internal use, may not be reproduced or re-disseminated in any form and may not be used as a basis for or a component of any financial instruments or products or indices. None of the MSCI information is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Historical data and analysis should not be taken as an indication or guarantee of any future performance analysis, forecast or prediction. The MSCI information is provided on an "as is" basis and the user of this information assumes the entire risk of any use made of this information. MSCI, each of its affiliates and each other person involved in or related to compiling, computing or creating any MSCI information (collectively, the "MSCI Parties") expressly disclaims all warranties (including, without limitation, any warranties of originality, accuracy, completeness, timeliness, non-infringement, merchantability and fitness for a particular purpose) with respect to this information. Without limiting any of the foregoing, in no event shall any MSCI Party have any liability for any direct, indirect, special, incidental, punitive, consequential (including, without limitation, lost profits) or any other damages. (www.msci.com)

Head Office:

Calton Square, 1 Greenside Row, Edinburgh EH1 3AN, Scotland
Telephone: +44 (0)131 275 2000 www.bailliegifford.com

Capital Group

Relevant Mandates: International Equity

Hired: 2001

Firm Information	Investment Approach	Total ARMB Account
<p>Capital Group is one of the largest privately held investment management organizations in the world serving thousands of leading institutions and millions of individual investors.</p> <p>Capital Group was founded in 1931 and is based in Los Angeles, California.</p> <p>As of 12/31/2020, Capital Group's total assets were approximately \$2.4 trillion and Capital International Inc.'s total assets under management were \$65.9 billion.</p> <p>Key Executives: Michael Bowman, <i>Senior VP, Relationship Manager</i> Gerald Du Manoir, <i>Senior VP, Portfolio Manager</i></p>	<p>Capital Group's fundamental investment process, The Capital System, seeks the best of both worlds: the high conviction of individual managers and the diversification of a team approach. Portfolios are divided into segments that are managed independently by individual portfolio managers. Each portfolio management team is comprised of portfolio managers and analysts with a variety of backgrounds and investment styles. Members are selected specifically to balance the inherent investment biases of their colleagues. A disciplined, multilayered governance structure oversees the system's operation.</p> <p>Benchmark: MSCI ACWI ex-US Index</p>	<p>Assets Under Management: 12/31/2020 \$612,542,166</p>

Concerns: None

12/31/2020 Performance

	<u>Last Quarter</u>	<u>1-Year</u>	<u>3-Years Annualized</u>	<u>5-Years Annualized</u>	<u>6-Years Annualized</u>
Capital Group	14.99%	22.05%	13.03%	14.54%	11.29%
Capital Group (net)	14.88%	21.56%	12.58%	14.09%	10.86%
MSCI ACWI ex-US Index	17.01%	10.65%	4.88%	8.93%	6.35%

A portfolio review to
Alaska Retirement
Management Board

A focus on
International All Countries Equity

March 19, 2021



An international
fund for the
long term

Investments are not FDIC-insured, nor are they deposits of or guaranteed by a bank or any other entity, so they may lose value.

© 2021 Capital Group. All rights reserved.

For institutional investors and financial professionals only. Not for use with the public.

Meeting participants



Michael A. Bowman is a senior business development manager at Capital Group. He has 29 years of investment industry experience and has been with Capital Group for 10 years. Prior to joining Capital, he was a senior director at Invesco responsible for client service and marketing of institutional strategies. Before that, he was a managing director for Advent Capital Management. He holds a bachelor's degree in economics from the University of Texas, Austin. Michael is based in San Francisco.



Steve Caruthers is an equity investment director at Capital Group. He has 26 years of investment industry experience and has been with Capital Group for 16 years. Prior to joining Capital, he was at J.P. Morgan serving as the primary investment contact for institutional retirement plan clients. He holds an MBA from the University of Missouri-Kansas City and a bachelor's degree from the University of Kansas. He also holds the Chartered Financial Analyst® designation and is a member of the CFA Society of Los Angeles. Steve is based in Los Angeles.



Kent Chan is an equity investment director at Capital Group. He has 29 years of investment industry experience and has been with Capital Group for five years. Prior to joining Capital, Kent spent over 20 years in Asia and most recently headed Taiwan equities and the Greater China equity research product at Barclays. Before that, he helped lead global and Asian technology equity research and the Asian consumer sector, as well as covering small-cap companies, at Citigroup. He holds a bachelor's degree in political economics from the University of California, Berkeley. Kent is based in Los Angeles.



Gerald Du Manoir is an equity portfolio manager at Capital Group. He has 31 years of investment experience and has been with Capital Group for 30 years. Earlier in his career at Capital, as an equity investment analyst, Gerald covered European construction building materials and European consumer goods companies. Gerald began his career at Capital as a participant in The Associates Program, a two-year series of work assignments in various areas of the organization. Prior to joining Capital, he spent six months with Donaldson, Lufkin & Jenrette/Autranet in New York. He holds a degree in international finance from the Institut Supérieur de Gestion in Paris graduating with honors. Gerald is based in Los Angeles.



Kelly McKale is a client relationship manager at Capital Group, home of American Funds. She has 20 years of industry experience and joined Capital Group in 2020. Prior to joining Capital, Kelly was head of investor relations at SailingStone Capital Partners. Before that, she was a partner and client relationship manager at Albourne America LLC. She holds a bachelor's degree in social science with economics from the Open University. She also holds the Chartered Alternative Investment AnalystSM designation. Kelly is based in San Francisco.

Your contacts

Kelly McKale
Client Relationship Manager
(213) 615-0437

Durrell Brown
Client Relations Analyst
(213) 615-0493

Annie Vest
Institutional Sales Support
Coordinator
(213) 486-9251

Client profile

Strategy	Account name	Account number	Inception date	Estimated account size USD millions
International All Countries Equity	Alaska Retirement Management Board - International All Countries Equity	11336000	7/31/01	\$611.11
Total as of December 31, 2020				\$611.11

Agenda

Organizational
overview

Strategy

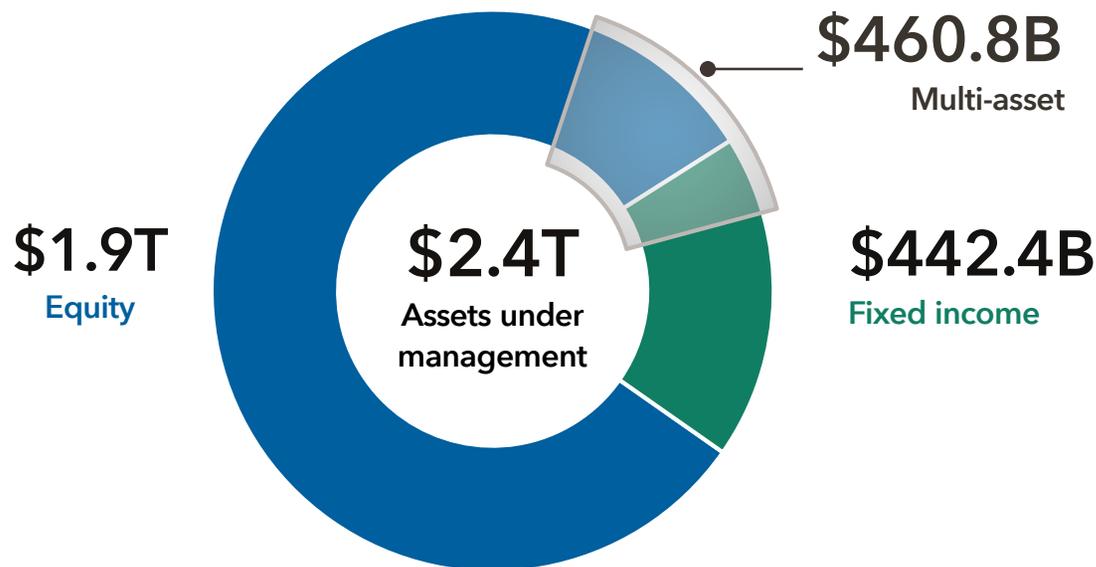
Markets overview

Results and
characteristics

Key attributes

A fundamental, research-driven global asset manager

Capital Group



Privately held organization, investing since 1931

Long-term approach driven by global fundamental research, including ESG considerations

Multiple portfolio manager teams combine high conviction with collaboration

Global reach, with 447 Capital Group investment professionals worldwide

Aligned with investors, with managers personally invested in their eligible mandates

Data as of December 31, 2020, and is preliminary.

Capital Group manages equity assets through three investment groups. These groups make investment and proxy voting decisions independently. Fixed income investment professionals provide fixed income research and investment management across the Capital organization; however, for securities with equity characteristics, they act solely on behalf of one of the three equity investment groups.

Fixed income assets managed by Capital Fixed Income Investors. All values in USD.

American Funds Distributors, Inc., member FINRA.

A global footprint

Capital has **112** portfolio managers and **231** analysts.



Data as of December 31, 2020.

Service offices are located in Amsterdam, Atlanta, Chicago, Frankfurt, Hampton Roads, Indianapolis, Irvine, Luxembourg, Madrid, Menlo Park, Milan, Montreal, Reno, San Antonio, Seattle, Shanghai, Sydney and Zurich.

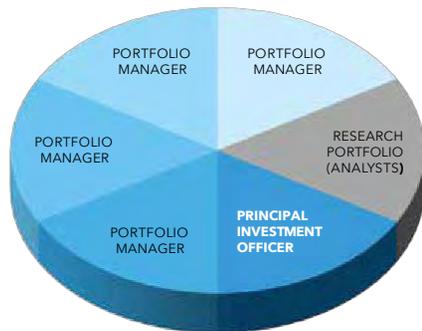
Statements attributed to an individual represent the opinions of that individual as of the date published and do not necessarily reflect the opinions of Capital Group or its affiliates. This information is intended to highlight issues and should not be considered advice, an endorsement or a recommendation. All Capital Group trademarks mentioned are owned by The Capital Group Companies, Inc., an affiliated company or fund. All other company and product names mentioned are the property of their respective companies.

The Capital SystemSM is at the root of our success

Combining experienced managers' best ideas into one portfolio creates the potential for superior long-term results

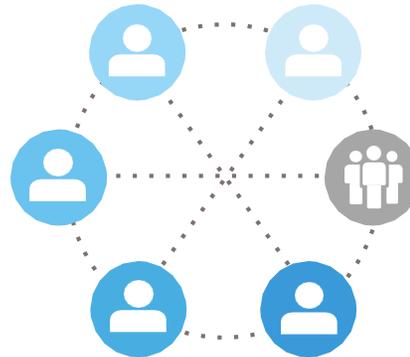
Individual conviction

- Each manager invests a portion of the portfolio
- In most portfolios, analysts also invest in their highest convictions within their areas of coverage



Collaboration

- Flat organizational structure fosters a cooperative culture among managers and analysts
- Robust interactions occur across regional and sector responsibilities
- Fixed income credit and equity analysts collaborate to cover a firm's entire capital structure



Accountability

- The Principal investment officer (PIO) is accountable for the strategy's investment objectives
- Managers and analysts are compensated based on individual results, with a heavier emphasis on longer term periods*
- Long-term investment horizons are conducive to ESG considerations

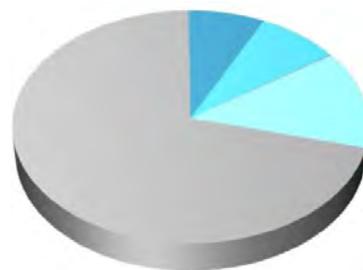
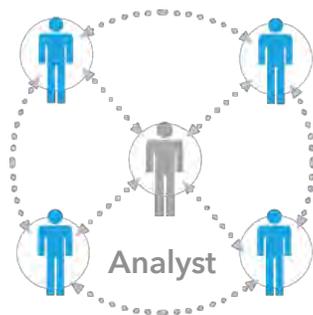


*Compensation paid to our investment professionals is heavily influenced by results over one-, three-, five- and eight-year periods, with increasing weight placed on each succeeding measurement period to encourage a long-term investment approach.

Portfolio managers shown are for illustrative purposes only.

A bottom-up process generating high-conviction ideas

Investment ideas often originate with long-tenured analysts and then grow as portfolio managers gain conviction



Analyst researches company

- Analyst meets company management
- Analyst also talks with global competitors, customers, suppliers and public officials to understand the business and its environment
- Portfolio managers and analysts spent 2,000+* hours developing proprietary ESG research in 2020
- Every stock in the portfolio is screened for ESG considerations

Analyst recommends and buys stock

- Analyst presents stock recommendation to investment group, followed by robust discussion
- Analyst buys stock within research portfolio as signal of conviction

Portfolio managers invest in stock

- One or more portfolio managers may invest in stock concurrently with analyst or following further investment discussions
- The stock's weighting in the portfolio grows as conviction strengthens and more managers invest

Monitor portfolio risk

- PIO oversees strategy's positioning
- Each strategy has clear guidelines, which can limit exposures to securities, regions, sectors and industries
- Global Investment Control unit monitors adherence to guidelines

PIO = principal investment officer

*Data as of fiscal year 2020

Disciplined capital appreciation for international equities

	International	
	International Equity	International All Countries Equity
Objective	Long-term growth of capital	
Primary Index	MSCI EAFE	MSCI ACWI ex USA
EM flexibility	0-10%	0-50%
Generally minimum market/float cap: Developed markets	\$1 billion	\$1 billion
Emerging markets	\$1 billion	\$750 million
Team		

————— EM flexibility —————>

Disciplined review process:

- Analyst recommendations are based on factors including specific return drivers to help meet the long-term growth of capital objective
- Each holding and its updated return expectations are reviewed on a quarterly basis
- Active PIO oversight and accountability

PIO = principal investment officer.
 Emerging markets guidelines can be set per client request.

International All Countries Equity

Why Capital Group for international equities



Flexible approach

- Focus on capital appreciation
- Fundamental approach with a focus on the long-term



Deep, comprehensive research

- Experienced team of analysts covering all regions, all sectors and all market caps
- Cross-sector and cross-region collaboration drives unique insights
- Analysts managing money improves investment recommendations



Global reach and access

- Global footprint enables coverage across industries, supply chains and competitive challenges
- Collaboration with fixed income team allows for coverage of entire capital structure
- Access and long-standing relationships with senior management



Aligned with client objectives

- Aim to generate excess return through all market cycles
- Incentive compensation emphasizes long-term results*
- Competitive fees

*Compensation paid to our investment professionals is heavily influenced by results over one-, three-, five- and eight-year periods, with increasing weight placed on each succeeding measurement period to encourage a long-term investment approach.

Summary of objectives and guidelines

Alaska Retirement Management Board

Objective

The portfolio will have a primary emphasis on diversification to minimize risk.

Guidelines and restrictions

Permitted

- 144As
- ADRs
- Closed-end funds, if they meet certain conditions
- Convertible securities
- Corporate bonds, if they meet certain conditions
- Equity and equity-related securities
- Equity-related derivative instruments, if they meet certain conditions (excluding forward currency contracts, which are permitted)
- ETFs, if they meet certain conditions
- GDRs
- Publicly traded partnerships
- Securities received as a result of corporate actions
- U.S. government securities, if they meet certain conditions
- Warrants, if they meet certain conditions

Prohibited

- No investment in commodities
- No investment in corporate debt obligations rated lower than A by S&P, Moody's or Fitch
- No investments in companies that are not permitted under Alaska's Iran restricted list
- No Pakistan securities
- No unlisted equity securities (excluding convertibles)

Other

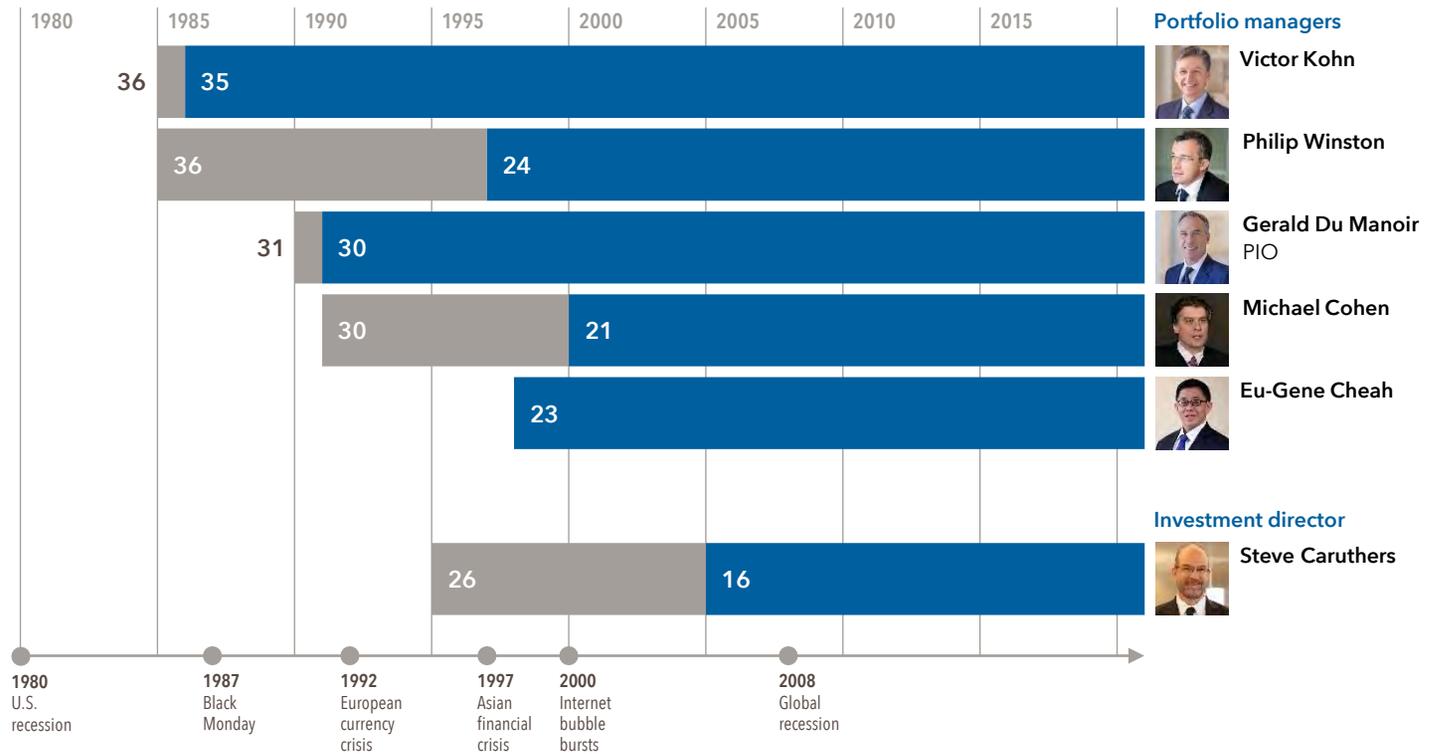
- Prior approval for cross trading
- Maximum 5% cash, calculated using a 10-day moving average, measured at market
- Maximum 5% of an issuer's outstanding voting shares, measured at market
- Maximum 100% hedging per country, measured at market
- Subject to ERISA standards by contract

Investment team: Diverse backgrounds and investment approaches

International All Countries Equity

- Managers have a median of 31 years in the industry and 24 years at Capital Group
- The strategy's portfolio managers are selected partly based on their complementary styles
- Managers bring diverse experiences, having previously worked as analysts in a variety of industries

■ Years with Capital Group
■ Years of investment experience



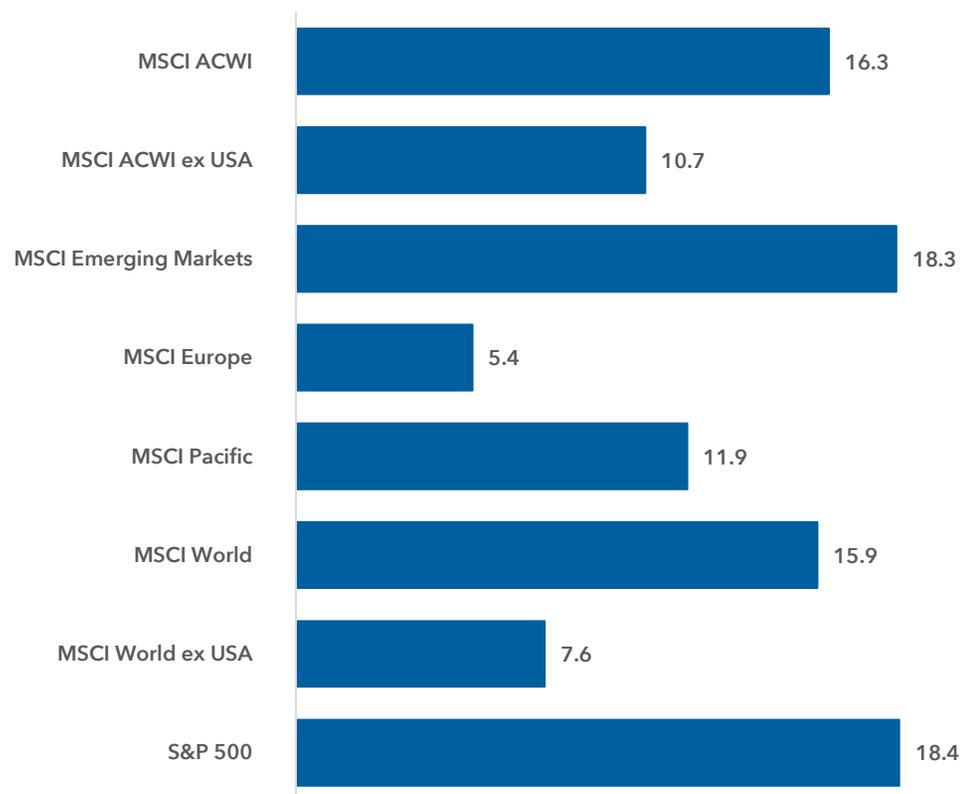
PIO = principal investment officer.

Reflects current team, shown in order of years of experience. Years of experience as of December 31, 2020. Manager responsibilities may have changed since that date. The investment director does not have portfolio management responsibilities in the strategy.

Markets overview

Markets overview: The world at a glance

Year-to-date total returns (% USD)



MSCI country returns (%)

	USD	Local currency	FX v. USD
	YTD	YTD	YTD
North America			
Canada	5.3	3.5	1.8
United States	20.7	20.7	-0.0
Europe			
France	4.1	-4.5	9.0
Germany	11.5	2.3	9.0
Italy	1.8	-6.6	9.0
Spain	-4.8	-12.6	9.0
Switzerland	11.6	1.9	9.5
United Kingdom	-10.5	-13.2	3.2
Asia-Pacific			
Australia	8.7	-1.0	9.8
Hong Kong	5.8	5.3	0.5
Japan	14.5	8.8	5.3
Emerging markets			
Brazil	-19.1	4.5	-22.6
China	29.4	28.1	1.1
India	16.1	18.9	-2.3
South Korea	46.0	37.2	6.5
Mexico	-1.6	3.8	-5.2
Russia	-11.6	3.4	-14.5
South Africa	-4.9	-0.1	-4.8
Taiwan	39.1	30.4	6.7

Data as of December 31, 2020.

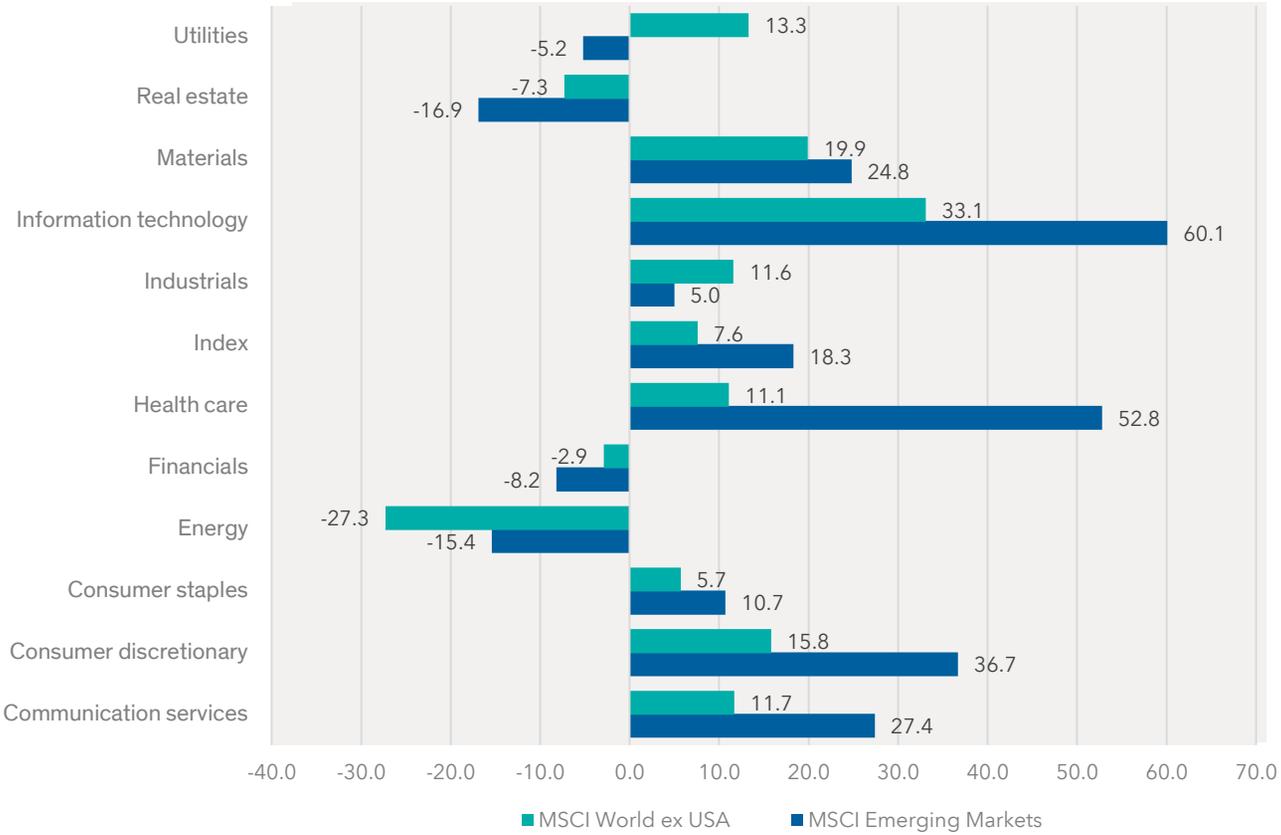
Sources: MSCI, RIMES, Standard & Poor's. MSCI Indices with net dividends reinvested. Some local indices contain USD-traded securities. The calculated exchange rate is the percent difference between the MSCI EM Investable Market Index local index return and the MSCI EM Investable Market Index USD index return. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Markets overview

Cumulative total return (YTD)



Sector returns (%) - year to date



Data as of December 31, 2020, unless otherwise noted. MSCI index results reflect net dividends reinvested. Sector returns reflect total return. Returns are in USD. Sources: RIMES, MSCI. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Results and characteristics: International All Countries Equity

Investment results

Alaska Retirement Management Board

Total returns for the periods ended December 31, 2020 (%)

	Cumulative			Average Annual				
	3 months	YTD	1 year	3 years	5 years	10 years	15 years	Lifetime
Portfolio								
– gross of management fees	15.05	22.08	22.08	13.03	14.60	9.00	6.99	7.63
– net of management fees	14.94	21.60	21.60	12.59	14.16	8.60	6.60	7.24
MSCI ACWI ex USA	17.01	10.65	10.65	5.19	8.01	5.78	4.66	5.73

Annual total returns as of December 31 (%)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Portfolio										
– gross of management fees	-12.69	20.83	23.49	-4.63	-3.58	3.52	32.21	-11.40	33.51	22.08
– net of management fees	-13.00	20.42	23.04	-4.97	-3.92	3.15	31.73	-11.75	32.99	21.60
MSCI ACWI ex USA	-12.14	17.32	22.78	-4.90	-0.81	1.00	25.03	-13.79	22.01	10.65

Portfolio inception: July 31, 2001. Index lifetime is based on inception date of the portfolio.

Returns are in USD and based on monthly data. Returns reflect the reinvestment of dividends, interest and other earnings.

MSCI index results reflect net dividends reinvested. Source: MSCI. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Attribution summary (relative)

Alaska Retirement Management Board – Year to date

Largest contributors (%)	Active weight	Stock return	Relative contribution
Evolution Gaming Group AB	1.55	239.97	1.79
Ocado Group PLC	3.31	84.51	1.55
MercadoLibre, Inc.	0.86	192.90	0.97
ISR: Taiwan Semiconductor Manufacturing Co., Ltd.	1.44	84.48	0.90
ISR: Yandex NV Class A	1.71	60.26	0.86
ASML Holding NV	1.43	65.79	0.67
Genmab A/S	1.12	81.92	0.60
Keyence Corporation	1.36	59.46	0.58
BeiGene, Ltd.	1.50	55.88	0.48
Enel SpA	2.28	32.86	0.45

Largest detractors (%)	Active weight	Stock return	Relative contribution
Tencent Holdings Ltd.	-0.47	51.32	-0.24
Wynn Macau Ltd.	0.44	-31.86	-0.25
China Resources Land Limited	1.00	-13.98	-0.26
ISR: Samsung Electronics Co., Ltd.	-0.58	59.41	-0.27
Safran S.A.	1.05	-8.18	-0.28
Meituan Class B	-0.32	190.52	-0.28
Galapagos NV	0.37	-52.96	-0.30
Shopify, Inc. Class A	-0.39	183.36	-0.32
China Overseas Land & Investment Limited	1.04	-41.55	-0.65
Airbus SE	1.13	-25.00	-0.67

Sector (%)	Active weight	Sector selection	Security selection	Relative contribution
Consumer discretionary	3.54	0.59	2.51	3.10
Financials	-2.23	0.36	2.08	2.44
Information technology	3.29	1.17	0.99	2.16
Energy	-3.49	1.60	0.24	1.84
Utilities	0.88	-0.08	1.21	1.13
Health care	0.94	-0.14	0.94	0.80
Communication services	0.60	0.02	0.63	0.65
Cash	3.37	0.33	0.00	0.33
Real estate	2.91	-0.74	1.06	0.32
Consumer staples	-2.43	0.02	-0.26	-0.24
Materials	-4.47	-0.55	0.03	-0.52
Industrials	-2.92	-0.07	-0.69	-0.77

Country (%)	Active weight	Country selection	Security selection	Relative contribution
Japan	-6.11	-0.28	2.70	2.36
United Kingdom	2.50	-0.53	2.75	2.13
Sweden	0.10	-0.04	1.65	1.68
Russia	2.20	-0.03	0.97	0.98
United States	0.86	0.00	1.06	0.98
France	2.02	-0.29	-0.12	-0.29
Belgium	0.88	-0.23	-0.19	-0.36
India	1.50	0.46	-1.03	-0.57
South Korea	-2.51	-0.82	0.09	-0.83
China	2.32	0.57	-2.29	-1.86

Data as of December 31, 2020.

Data reflect the Alaska Retirement Management Board portfolio vs. MSCI ACWI ex. USA with net dividends reinvested .

Source: MSCI. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Cash may include short-term securities, accrued income and other assets less liabilities as well as currencies. It may also include investments in money market or similar funds, which may be managed by the investment adviser or its affiliates that are not offered to the public.

See attribution methodology disclosure for additional information.

Twenty largest holdings

Alaska Retirement Management Board

Ranking		Holding	Sector	Country	Portfolio (%)	Index (%)
Current 12/31/20	Previous 12/31/19					
1	4	Ocado Group	Consumer discretionary	United Kingdom	3.7	0.1
2	1	TSMC	Information technology	Taiwan	3.3	1.8
3	3	AIA Group	Financials	Hong Kong	2.3	0.6
4	10	ASML	Information technology	Netherlands	2.3	0.8
5	36	Evolution Gaming	Consumer discretionary	Sweden	2.2	0.1
6	5	Enel	Utilities	Italy	2.0	0.3
7	19	Yandex	Communication services	Russian Federation	1.8	0.1
8	9	Ping An Insurance	Financials	China	1.8	0.3
9	33	BeiGene	Health care	China	1.7	0.0 *
10	13	Keyence	Information technology	Japan	1.6	0.4
Total companies 1 through 10					22.6	4.5
11	12	Vale	Materials	Brazil	1.5	0.2
12	8	ICICI Bank	Financials	India	1.4	0.1
13	2	Airbus	Industrials	France	1.4	0.3
14	77	MercadoLibre	Consumer discretionary	United States	1.3	–
15	17	Longfor Group	Real estate	China	1.2	0.0 *
16	6	AstraZeneca	Health care	United Kingdom	1.2	0.5
17	11	Safran	Industrials	France	1.2	0.2
18	47	Tencent	Communication services	China	1.2	1.7
19	44	Tokyo Electron	Information technology	Japan	1.1	0.2
20	28	Kering SA	Consumer discretionary	France	1.1	0.2
Total companies 1 through 20					35.3	7.9

Data reflect the Alaska Retirement Management Board portfolio, unless otherwise noted.

Index reflects MSCI All Country World Index (ACWI) ex USA. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

The information shown does not include cash and cash equivalents. This includes shares of money market or similar funds managed by the investment adviser or its affiliates that are not offered to the public. Totals may not reconcile due to rounding.

*Holding is less than 0.05% of the index.

Sector diversification

Alaska Retirement Management Board

	Portfolio (%)		Index (%) 12/31/20
	12/31/19	12/31/20	
Energy	1.8	1.3	4.3
Reliance Industries		0.6	
Rosneft		0.3	
galp		0.2	
Materials	3.7	3.5	8.1
Vale		1.5	
Shin-Etsu		0.9	
Asahi Kasei		0.3	
Industrials	11.3	8.6	11.6
Airbus		1.4	
Safran		1.2	
MTU Aero Engines		0.7	
Consumer discretionary	13.7	17.3	13.8
Ocado Group		3.7	
Evolution Gaming		2.2	
MercadoLibre		1.3	
Consumer staples	7.7	5.4	8.9
Carlsberg		0.9	
Nestlé		0.7	
Reckitt Benckiser		0.5	
Health care	9.3	10.3	9.6
BeiGene		1.7	
AstraZeneca		1.2	
Chi-Med		1.1	

	Portfolio (%)		Index (%) 12/31/20
	12/31/19	12/31/20	
Financials	19.1	15.3	18.0
AIA Group		2.3	
Ping An Insurance		1.8	
ICICI Bank		1.4	
Information technology	14.3	16.7	12.7
TSMC		3.3	
ASML		2.3	
Keyence		1.6	
Communication services	6.4	5.7	7.1
Yandex		1.8	
Tencent		1.2	
Utilities	3.6	4.0	3.3
Enel		2.0	
Iberdrola		0.8	
Real estate	5.8	4.5	2.6
Longfor Group		1.2	
TAG Immobilien		1.1	
Total equity	96.7	92.5	100.0
Total cash & equivalents	3.3	7.5	–
Total assets	100.0	100.0	100.0

Data reflect the Alaska Retirement Management Board portfolio, unless otherwise noted.

Data shown reflect the top holdings in each sector.

Index reflects MSCI All Country World Index (ACWI) ex USA. Source: MSCI. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Cash & equivalents includes short-term securities, accrued income and other assets less liabilities. It may also include investments in money market or similar funds managed by the investment adviser or its affiliates that are not offered to the public.

Totals may not reconcile due to rounding.

Geographic diversification

Alaska Retirement Management Board

	Portfolio (%)		Index (%)
	12/31/19	12/31/20	12/31/20
Eurozone	25.4	22.2	20.2
France	10.5	8.8	6.9
Germany	7.1	5.2	5.9
Netherlands	2.6	3.0	2.4
Italy	2.3	2.0	1.5
Spain	1.1	1.3	1.5
Belgium	1.5	1.1	0.6
Ireland	0.3	0.5	0.4
Portugal	0.1	0.2	0.1
Austria	–	0.2	0.1
Finland	–	–	0.7
Other Europe/Middle East	21.6	19.1	19.2
United Kingdom	13.5	9.3	8.8
Denmark	3.5	3.5	1.6
Switzerland	2.4	2.8	6.0
Sweden	1.2	2.5	2.1
Norway	0.9	1.0	0.4
Israel	–	–	0.4
Total Europe/Middle East	47.0	41.3	39.4

	Portfolio (%)		Index (%)
	12/31/19	12/31/20	12/31/20
Pacific Basin	16.2	15.3	23.1
Japan	10.4	10.0	15.8
Hong Kong	5.7	4.6	2.0
Singapore	–	0.3	0.7
Australia	–	0.3	4.4
New Zealand	0.1	0.2	0.2
Emerging markets	32.0	33.3	31.0
China	10.7	14.1	12.2
India	4.1	4.9	2.9
Taiwan	3.9	3.7	4.0
Brazil	3.6	3.5	1.6
Russia	3.1	3.2	0.9
South Korea	1.5	1.0	4.2
Indonesia	2.3	0.9	0.4
South Africa	0.9	0.7	1.1
Iceland	–	0.4	–
Thailand	0.1	0.3	0.6
Other	1.8	0.6	3.2
North America	1.6	2.6	6.3
Canada	1.0	1.3	6.3
United States	0.5	1.3	–
Total equity	96.7	92.5	100.0
Total cash & equivalents	3.3	7.5	–
Total assets	100.0	100.0	100.0

Data reflect the Alaska Retirement Management Board portfolio, unless otherwise noted.

Index reflects MSCI All Country World Index (ACWI) ex USA. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Cash & equivalents includes short-term securities, accrued income and other assets less liabilities. It may also include investments in money market or similar funds managed by the investment adviser or its affiliates that are not offered to the public.

Totals may not reconcile due to rounding.

Notable purchases and sales

Alaska Retirement Management Board – Trailing 12 months

Purchases		Sales	
Security name	Amount (\$)	Security name	Amount (\$)
Atlassian	5,550,471.64 ■	TSMC	10,661,093.42
PagSeguro	5,291,046.89 ■	Iberdrola	9,869,193.61
Reliance Industries	3,610,317.39 ■	Svenska Handelsbanken	8,526,650.43
ENGIE	2,789,349.61 ■	Bank Central Asia	7,707,447.01 ■
ABB	1,924,389.42 ■	Vodafone	7,649,231.38
China Merchants Bank	1,873,124.15	Genmab	6,899,609.58
United Spirits	1,853,372.80 ■	HDFC Bank	5,673,109.18
Marel	1,827,440.39 ■	Ping An Insurance	4,506,123.84
Pharmaron	1,794,760.31 ■	Enel	4,489,840.80
IIFL Wealth	1,770,905.47 ■	AstraZeneca	4,378,617.69
BeiGene	1,733,026.46	Petrobras	4,329,502.47 ■
STMicroelectronics	1,728,738.10 ■	London Stock Exchange Group	3,510,453.49
Hypera SA	1,716,391.68	Keyence	3,407,351.75
ESR	1,674,549.75	Pernod Ricard	3,330,517.49 ■
HDFC Life	1,562,742.41 ■	Samsung Electronics	3,288,074.85
Industria de Diseno Textil SA	1,542,549.54	DSV	3,265,966.80
Infineon Technologies	1,539,047.70 ■	América Móvil	3,042,232.31 ■
Lightspeed	1,537,768.98 ■	Carlsberg	2,952,547.32
DNB	1,529,837.48 ■	Lojas Americanas	2,784,182.46
B&M European Value Retail	1,527,100.32 ■	Rheinmetall	2,758,059.37

■ New ■ Eliminated

Data as of December 31, 2020.

Data reflect the Alaska Retirement Management Board portfolio, unless otherwise noted. All values in USD.

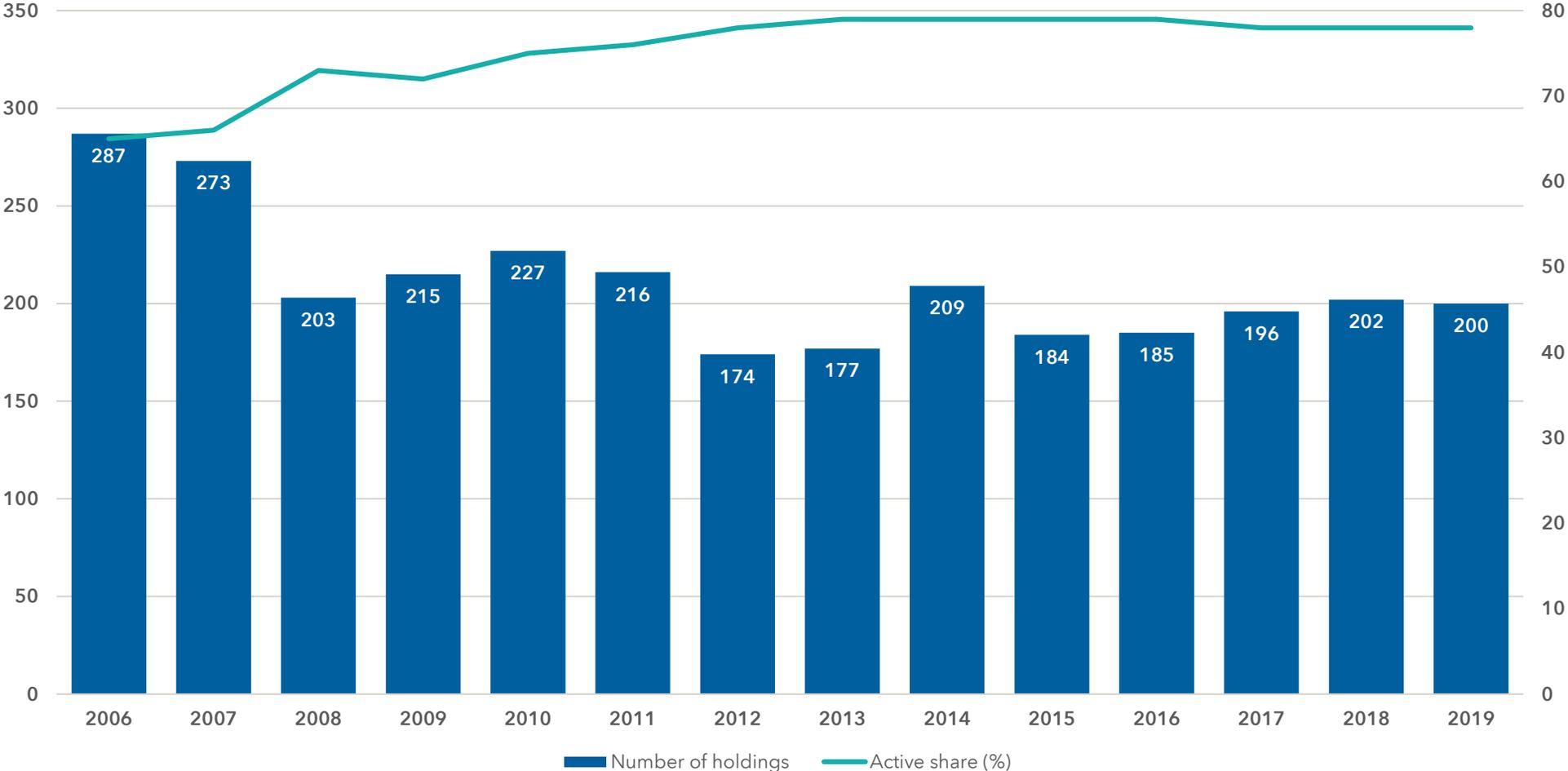
Net contributions and withdrawals from December 31, 2019 – December 31, 2020: -\$49.0 million.

Reflects largest purchases and sales of common stock. Excludes depositary receipts, fixed income and other non-equity securities.

Key attributes: International All Countries Equity

Holdings have come down, active share has increased

International All Countries Equity



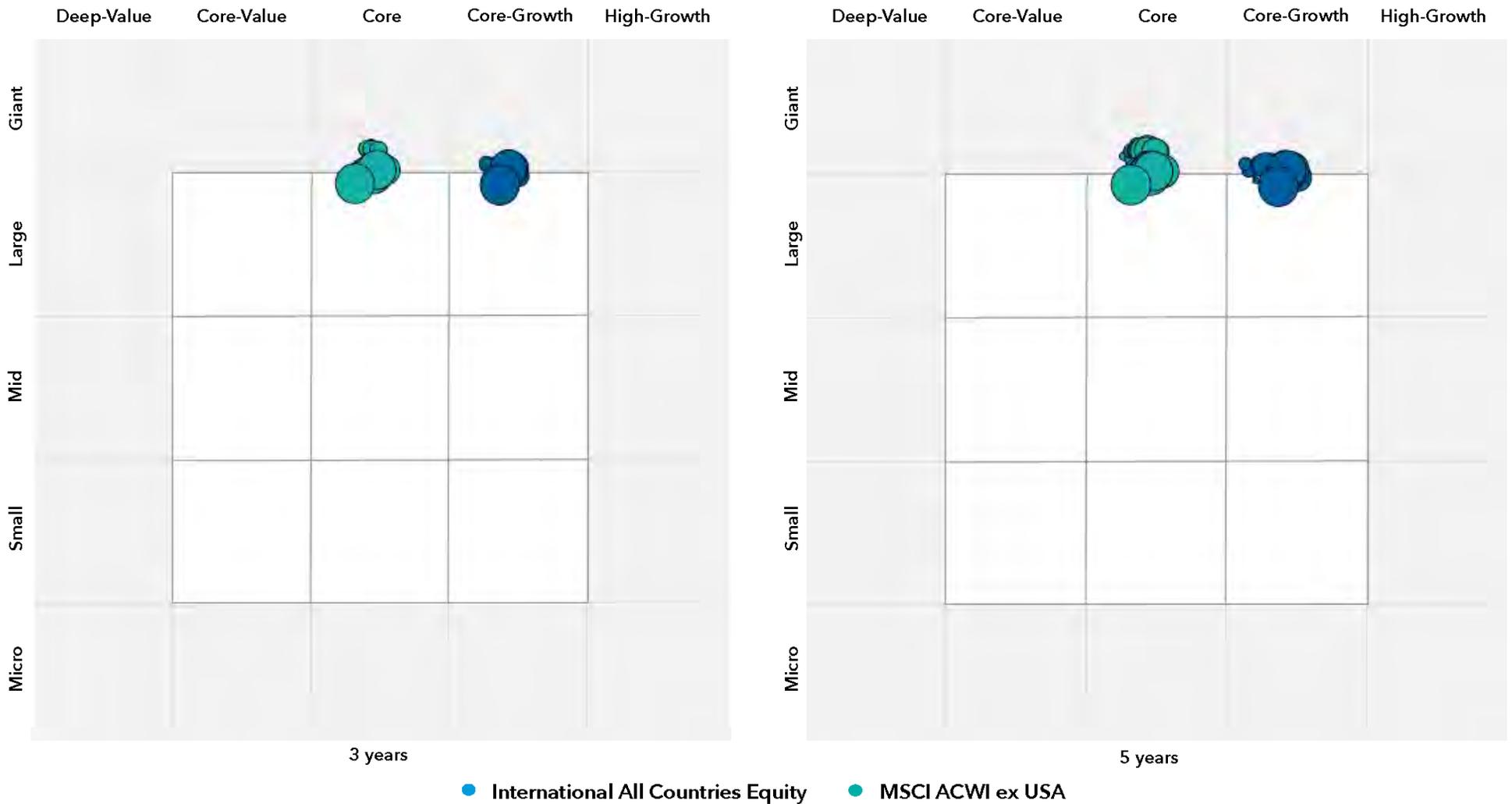
Data as of December 31, 2019.

Data reflect the representative portfolio of the Capital Group International All Countries Equity Composite, unless otherwise noted.

Source: FactSet.

Holdings-based style trail

International All Countries Equity



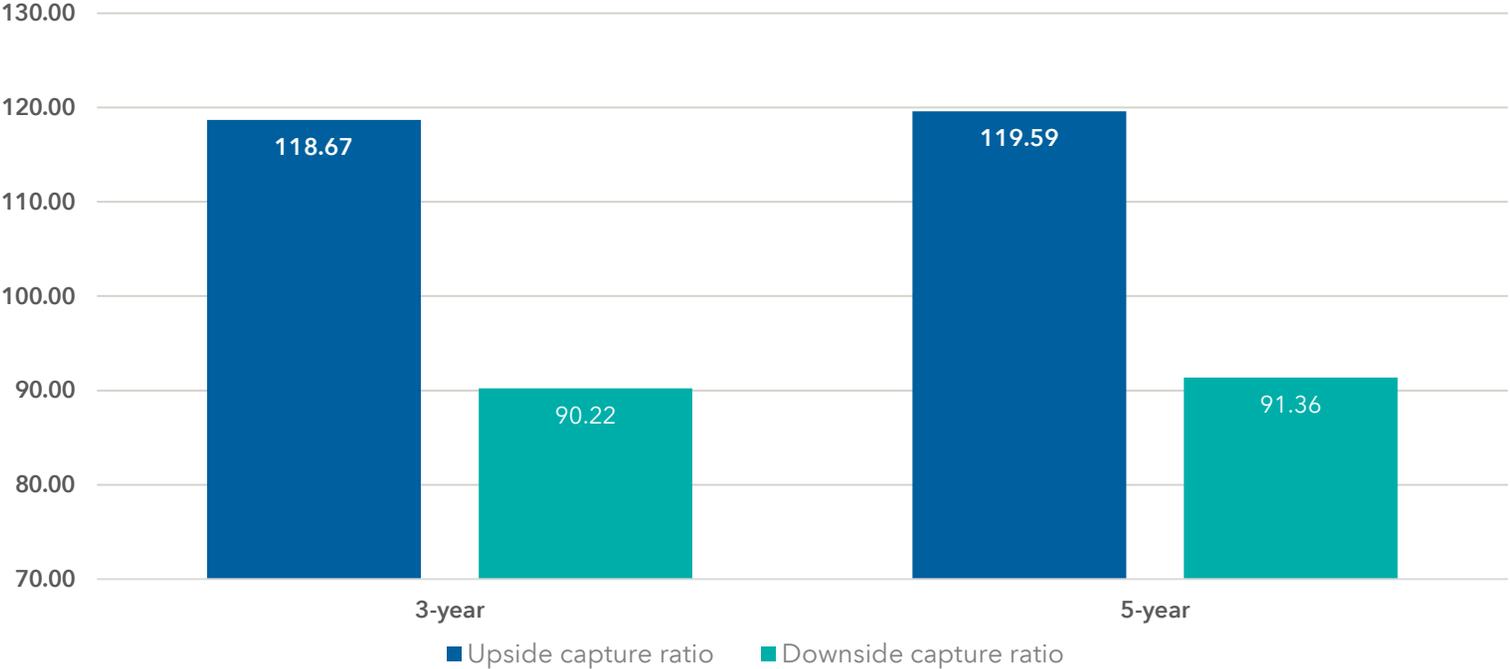
Data as of December 31, 2019.

Data reflect the International All Countries Equity Composite vs. MSCI ACWI ex USA.

Source: © Morningstar 2020. All rights reserved. Use of this content requires expert knowledge. It is to be used by specialist institutions only. The information contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied, adapted or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information, except where such damages or losses cannot be limited or excluded by law in your jurisdictions. Past financial performance is no guarantee of future results.

Up market capture/down market capture vs. MSCI EAFE

International All Countries Equity



This information supplements or enhances required or recommended disclosure and presentation provisions of the GIPS® standards, which if not included herein, are available upon request. GIPS is a trademark owned by CFA Institute.

Data as of December 31, 2020.

Data reflect Capital Group International All Countries Equity Composite vs. MSCI All Country World ex USA.

Past results are no guarantee of future performance.

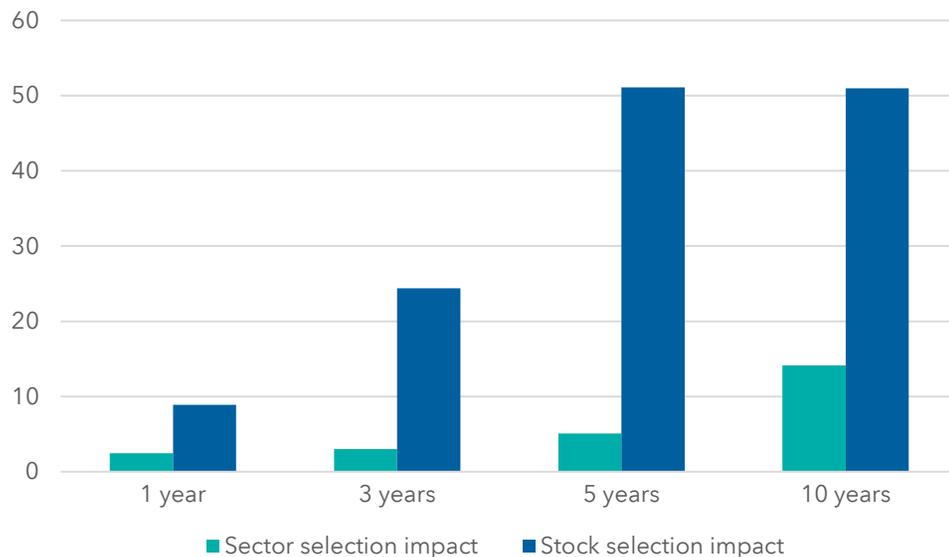
Source: Morningstar.

We add value primarily through stock selection

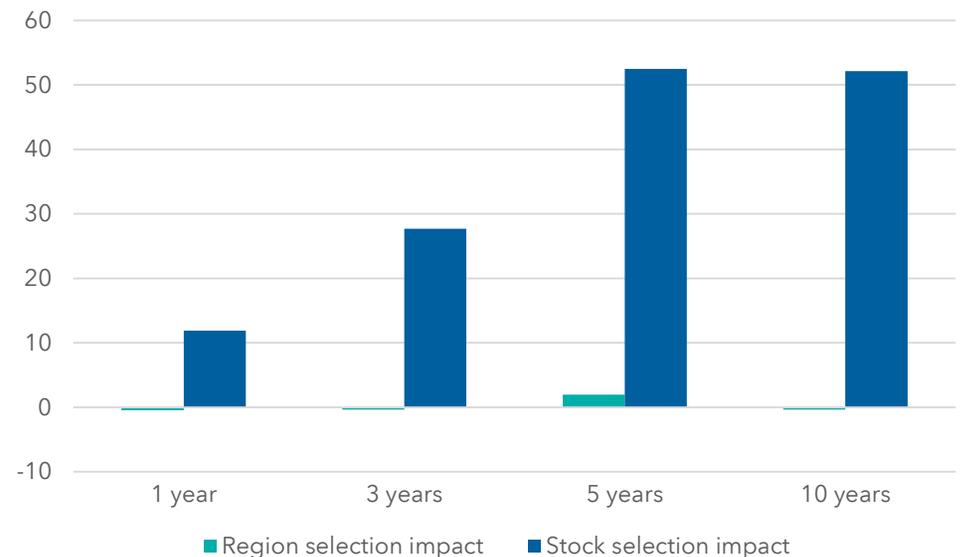
Our bottom-up investment process strives to achieve alpha primarily through stock selection, rather than sector or region selection

International All Countries Equity: Contributors to results for period ended December 31, 2020

Stock vs. sector selection (%)



Stock vs. region selection (%)



Equity attribution data was produced using FactSet, a third-party software system, based on daily portfolios. Securities in their initial period of acquisition may not be included in this analysis. The analysis includes equity investments only and excludes forward contracts and fixed income investments, if applicable. It does not account for buy and sell transactions that might have occurred intraday. As a result, average portfolio weight percentages are approximate and the actual average portfolio weight percentages might be higher or lower. Data elements such as pricing, income, market cap, etc., were provided by FactSet. The index provided for attribution is based on FactSet's methodology. The index is a broad-based market benchmark and may not be used by Capital Group as the sole comparative index for this fund. Capital believes the software and information from FactSet to be reliable. However, Capital cannot be responsible for inaccuracies, incomplete information or updating of information by FactSet. Past results are not predictive of results in future periods.

Region selection impact reflects local returns.

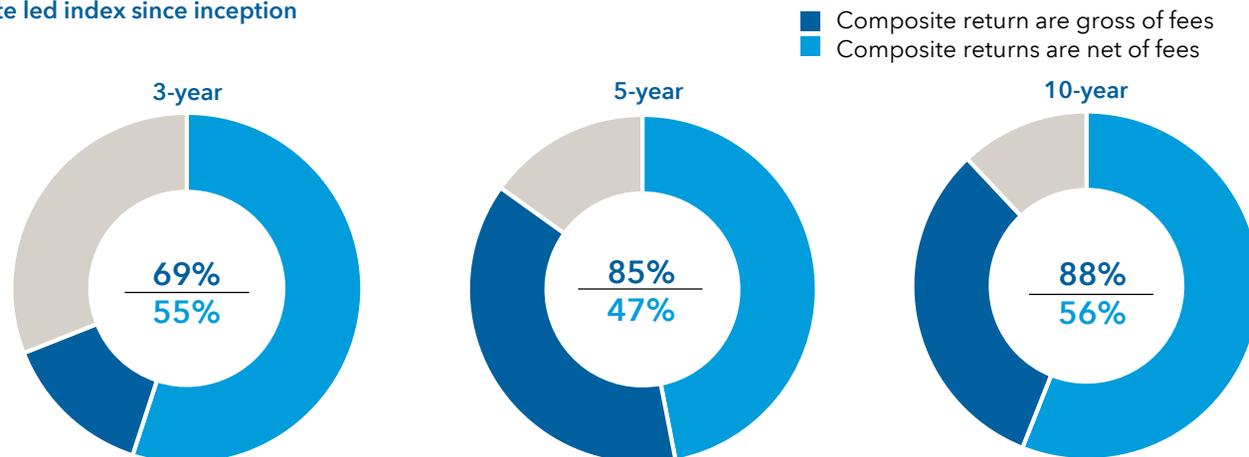
Source: Capital Group.

Persistently strong long-term results

Capital Group International All Countries Equity Composite

Results as of December 31, 2020.

Percentage of monthly rolling periods in which composite led index since inception



Average annual rolling return over composite's lifetime (% , net of fees)

	3-year	5-year	10-year
Capital Group International All Countries Equity Composite	7.8	6.6	5.6
Index	7.2	6.1	5.3
Average annual excess return (%)	0.7	0.6	0.4

Composite inception: September 30, 2001.

Returns reflect the Capital Group International All Countries Equity Composite net of fees.

Returns are in USD.

Gross results do not reflect the deduction of fees and expenses; results would have been lower if they were subject to fees and expenses. Composite net results are calculated by deducting from the gross results the highest investment management and advisory fees applicable to any account in the composite. Actual fees may vary depending on, among other things, the applicable fee schedule and portfolio size.

Index reflects MSCI ACWI ex USA Index with net dividends reinvested with net dividends reinvested. Investment results assume all distributions are reinvested and reflect applicable fees and expenses. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Rolling periods for the composite are measured on a monthly basis from the first full month since inception through December 31, 2020.

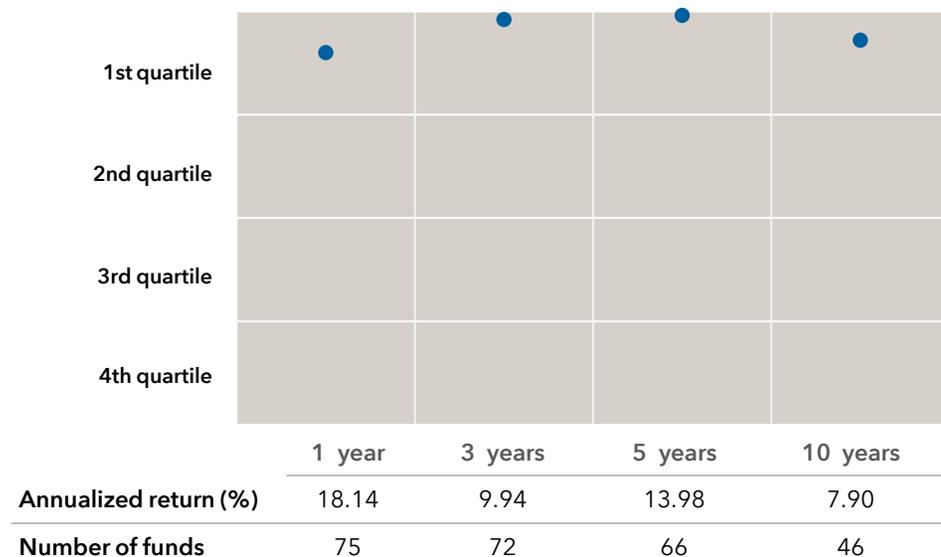
Source: Capital Group.

Absolute and risk-adjusted results

International All Countries Equity

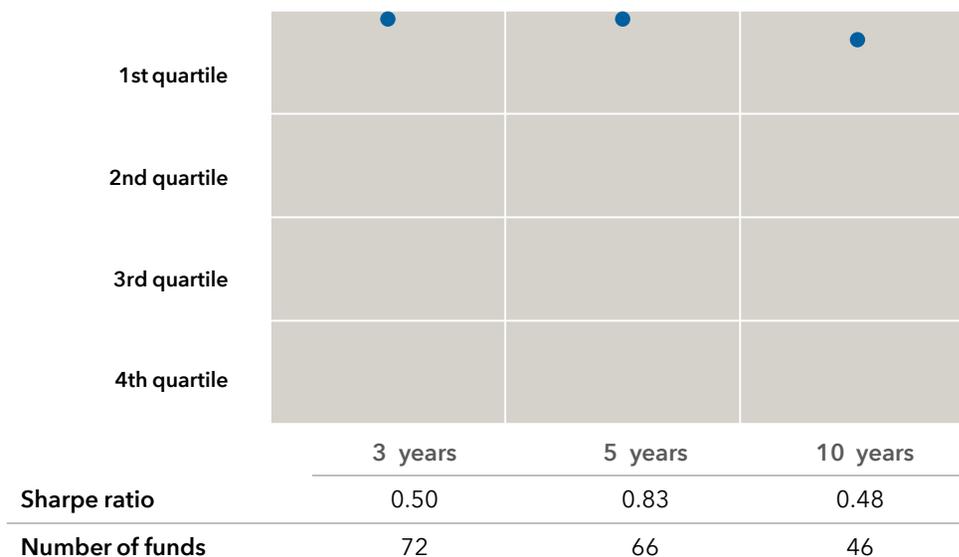
Percentile return rankings

As of September 30, 2020



Percentile Sharpe ratio rankings

As of September 30, 2020



Information ratio

As of September 30, 2020

	3 years	5 years	10 years
Capital Group International All Countries Equity	2.64	2.12	1.01
eVestment universe median	0.39	0.33	0.60

The strategy's eVestment category is ACWI ex-US Large Cap Core Equity. Sharpe ratio reflects FTSE 3-month T-Bill. Information ratio reflects MSCI EAFE Index.

Past results are no guarantee of future performance.

Source: eVestment collects information directly from investment management firms and other sources believed to be reliable. eVestment does not guarantee or warrant the accuracy, timeliness, or completeness of the information provided and are not responsible for any errors or omissions. Performance results may be provided with additional disclosures available on our systems and other important considerations such as fees may be applicable. Not for general distribution. All categories not necessarily included. Totals may not equal 100%.

Appendix

Portfolio manager biographies and investment approaches

International All Countries Equity



Eu-Gene Cheah is an equity portfolio manager at Capital Group. He has 23 years of investment experience, all with Capital Group. Earlier in his career at Capital, he was an equity investment analyst covering pharmaceutical and biotechnology companies globally. He was also a country analyst for Singapore. Before joining Capital, Eu-Gene was a physician in the U.K., where he was a Member of the Royal College of Physicians and a Fellow of the Royal College of Ophthalmologists. He holds an MBA with distinction from INSEAD, France, and a degree in clinical medicine from Oxford University, where he was a Rhodes Scholar. Eu-Gene is based in Singapore.

Eu-Gene has a core approach to investing based on deep, bottom-up fundamental research. The core of his investments consists of companies with a sustainable advantage. These would largely arise from companies with a superior management team, and a business that can maintain a competitive advantage in a large and growing market. These companies will always form the majority of his investments, and he would generally hold these companies for the long term. Eu-Gene also believes there is a place for more contrarian and cyclical ideas, as long as we can identify the probable turning points for these investments. He is also not averse to investing in companies that are at a very early stage in their evolution if the ultimate potential of these companies is very high. His investment style may be eclectic but his approach to finding a good investment remains exactly the same – it is always based on fundamental research, and a reliance on our internal network of experts to try and understand these companies better than the mainstream. He also believes that an understanding of the downside is very important and that protection of the portfolio in a bear market is of equal importance to capturing out-performance in a bull market.



Michael Cohen is an equity portfolio manager at Capital Group. He has 30 years of investment experience and has been with Capital Group for 21 years. Earlier in his career, as an equity investment analyst at Capital, Michael covered European utilities companies, as well as companies domiciled in Israel. Before joining Capital, he was a research analyst with both Schrodgers and Salomon Brothers in London. He holds an MBA from the London Business School and a bachelor's degree in accounting and economics from Tel Aviv University. Michael is based in London.

Good management and a prospering industry are two key criteria Michael uses when determining the companies he'll invest in. He looks for industries with strong, relatively predictable growth prospects, and seeks companies that have strong market positions and sound business strategies, backed by reliable management. Although macro views can influence his investment decisions, they don't drive his stock selection. "For the long-term future of the business, the people who manage it and the industry itself are the main investment parameters I'm focusing on, rather than the macro," he says. When it comes to valuations, he is willing to pay what he feels is fair value for a company if he believes it can thrive. He holds a concentrated portfolio that usually contains between 18 and 30 holdings, as he feels few companies meet his investment criteria. Balance sheets are also important to his investment decisions.

Portfolio manager biographies and investment approaches (continued)

International All Countries Equity



Gerald Du Manoir is an equity portfolio manager at Capital Group. He has 31 years of investment experience and has been with Capital Group for 30 years. Earlier in his career at Capital, as an equity investment analyst, Gerald covered European construction building materials and European consumer goods companies. Gerald began his career at Capital as a participant in The Associates Program, a two-year series of work assignments in various areas of the organization. Prior to joining Capital, he spent six months with Donaldson, Lufkin & Jenrette/Autranet in New York. He holds a degree in international finance from the Institut Supérieur de Gestion in Paris graduating with honors. Gerald is based in Los Angeles.

Gerald is a tenacious investor who does not like to pay for high valuations and will patiently wait for them to come down. He likes the visibility of cash flows and companies with strong asset bases. "I also like global franchises, whether they are consumer brands or technology companies." Gerald tends to avoid highly cyclical companies with uncertain earnings cycles, and is likely to sell in momentum-driven markets. While he holds investments in companies he likes for extended periods, he constantly retests the thesis of each investment and will sell when the thesis weakens. His portfolio has a low turnover rate and generally holds between 30 and 50 stocks, with the smaller investments being starter positions. He is comfortable with the top 10 holdings being a large proportion of his overall portfolio.



Victor D. Kohn is an equity portfolio manager at Capital Group. He is president of Capital International, Inc. He has 36 years of investment experience and has been with Capital Group for 35 years. Earlier in his career, as an equity investment analyst at Capital, Victor covered Chile, Argentina and Brazil. Prior to joining Capital, Victor was an analyst in the venture capital group at Montgomery Securities. He holds an MBA from Stanford Graduate School of Business and both master's and bachelor's equivalent degrees summa cum laude in industrial engineering from the Universidad de Chile. He also holds the Chartered Financial Analyst® designation. Victor is based in Los Angeles.

Victor likes to invest in growth businesses in which a company is building a franchise and has a competitive advantage, such as a distribution or brand advantage. Victor typically does not prefer businesses in which the macroeconomic environment tends to be an overwhelming component of its investment thesis. His portfolio is typically concentrated around 50 companies, in which the top 20 represent roughly 70% of his portfolio. His process involves evaluating the business itself, then assessing whether the valuation is reasonable in the context of similar companies. He is unlikely to buy a good business with very high multiples unless the company is at a young stage of development and has a "long runway" ahead of it. Balance sheet quality is important to Victor: "Most of the companies I invest in have fairly low leverage and are hence more resilient to variability of results."

Portfolio manager biographies and investment approaches (continued)

International All Countries Equity



Philip Winston is an equity portfolio manager at Capital Group. He has 36 years of investment experience and has been with Capital Group for 24 years. Earlier in his career, in addition to being a portfolio manager, Philip was an equity investment analyst at Capital covering U.K. property and paper & packaging companies, as well as European property and media companies. Before joining Capital, he was a director and U.K. equity fund manager at BZW Investment Management in London. Prior to that, he worked at Orion Royal Bank in London and New York. He holds a PhD and a master's degree in history from Cambridge University. Philip is based in London.

Philip looks for well-run companies with long-term, sustainable franchises, good cash flows, high returns on invested capital and strong balance sheets. He prefers to invest in companies that have high or rising market shares in growing industries and, ideally, with high barriers to entry, to keep potential competitors at bay. Philip also is attracted to companies that are undergoing change and restructuring, or are misunderstood by investors. He calls them "the overlooked, the unloved and the forgotten." Philip wants to hold his stocks for several years. He is not as concerned about achieving the lowest entry price as he is about potentially missing a good opportunity and benefiting from the compounding effects of high returns. Thus, he will buy at a reasonable price.

A long-term track record

Capital Group International All Countries Equity Composite

Capital Group International All Countries Equity Composite investment results, net of highest fees (%)

Annual total returns as of December 31 (%)

	Composite	Index	Excess return
2002	-16.63	-14.95	-1.68
2003	37.98	40.83	-2.85
2004	14.39	20.91	-6.52
2005	21.90	16.62	5.28
2006	22.22	26.65	-4.43
2007	18.33	16.65	1.68
2008	-43.42	-45.53	2.11
2009	35.88	41.45	-5.57
2010	10.06	11.15	-1.09
2011	-17.30	-13.71	-3.59
2012	20.28	16.83	3.45
2013	21.15	15.29	5.86
2014	-6.91	-3.87	-3.04
2015	-6.72	-5.66	-1.06
2016	5.14	4.50	0.64
2017	37.41	27.19	10.22
2018	-11.75	-14.20	2.45

Annual total returns as of December 31 (%)

	Composite	Index	Excess return
2019	30.91	21.51	9.40
2020	21.36	10.65	10.71

Average annual returns as of December 31, 2020 (%)

	Composite	Index	Excess return
1 year	21.36	10.65	10.71
3 years	11.92	4.88	7.04
5 years	15.16	8.93	6.23
10 years	7.80	4.92	2.88
Lifetime	8.41	7.12	1.29

Composite results are those of all portfolios managed by the same investment adviser with substantially similar investment objectives, policies, strategies and risks. Fees and expenses among investment vehicles will vary, and composite results would have been lower if they were subject to higher fees and expenses.

Composite inception: September 30, 2001.

Returns are in USD. The excess return is calculated arithmetically.

Composite results reflect the reinvestment of dividends, interest and other earnings. Results are net of withholding taxes on dividends, interest and capital gains. Actual withholding tax rates vary according to the country of denomination and tax status of each portfolio. Composite net results are calculated using the current highest fees and expenses deducted from the gross results. Actual fees may vary depending on, among other things, the applicable fee schedule and portfolio size. Past performance does not guarantee future results. Please see capitalgroup.com for more information.

Market indexes are unmanaged and, therefore, have no expenses. Investors cannot invest directly in an index. There have been periods when the fund has lagged the index.

When applicable, investment results reflect fee waivers and/or expense reimbursements, without which results would have been lower. Please see capitalgroup.com for more information.

Index reflects Capital Group International All Countries Equity Composite Historical Benchmark Index. Index returns reflect results of the composite's current and former benchmark indexes: MSCI All Country World Index, October 2011-present; MSCI World Index, composite inception-September 2011.

MSCI Index results reflect dividends net of withholding taxes. Source: MSCI. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Attribution methodology notes

Alaska Retirement Management Board – With security-level relative attribution

Portfolio name

Alaska Retirement
Management Board

Benchmark name

MSCI ACWI ex USA Index
with net dividends
reinvested

Currency name

USD

Attribution methodology notes

The attribution data was produced using FactSet, a third-party software system, based on daily holdings and daily transactions. The analysis includes equity investments, cash, forward contracts, fixed income investments, and commingled fund investments, if applicable. Data elements such as pricing, income, and exchange rates were furnished by Capital Group, but market cap was provided by FactSet. The index provided for attribution is based on FactSet's methodology. Capital Group believes the software and information from FactSet to be reliable. However, Capital Group cannot be responsible for inaccuracies, incomplete information or updating of information by FactSet.

Cash/cash and equivalents/cash and money market may include short-term securities, accrued income and other assets less liabilities as well as currencies. It may also include investments in money market or similar funds, which may be managed by the investment adviser or its affiliates that are not offered to the public.

Report methodology notes

All of the pages contained in the report that display the portfolio weights, benchmark weights and weight differences are average weights over the period. The mnemonic 'ISR:' indicates that two or more issues of the same issuer have been rolled up and thus what is presented in the report is the Issuer Level data. The attribution that is provided and calculated by FactSet, including the portfolio returns contained within the report, is gross of management fees.

Attribution index description

From	To	Weight	Index
Earliest	12/31/2019	100.00%	MSCI EAFE Index with net dividends reinvested
1/01/2020	Current	100.00%	MSCI ACWI ex USA Index with net dividends reinvested

Capital Group International All Countries Equity Composite

Composite information in USD

Period ending	Annual composite gross return (%)	Annual composite net return (%)	Annual index return (%)	Annualized three-year composite standard deviation (%)	Annualized three-year index standard deviation (%)	Annual composite dispersion (%)	Numbers of portfolios in composite	Assets in composite (millions)	Total GIPS firm assets (millions)
12/31/2011	-16.71	-17.30	-13.71	21.40	22.71	0.50	8	1,847	1,084,964
12/31/2012	21.12	20.28	16.83	18.62	19.26	0.31	6	1,871	1,144,251
12/31/2013	21.98	21.15	15.29	16.26	16.23	–	–	2,092	1,336,777
12/31/2014	-6.25	-6.91	-3.87	12.69	12.81	–	–	1,947	1,395,198
12/31/2015	-6.06	-6.72	-5.66	12.93	12.13	–	–	1,796	1,389,111
12/31/2016	5.88	5.14	4.50	13.81	12.51	–	–	1,832	1,477,471
12/31/2017	38.35	37.41	27.19	13.70	11.87	–	–	2,486	1,774,963
12/31/2018	-11.13	-11.75	-14.20	12.89	11.38	–	–	2,020	1,673,038
12/31/2019	31.81	30.91	21.51	12.18	11.34	–	–	2,085	2,048,754
12/31/2020	22.20	21.36	10.65	18.27	–	–	–	–	–

This material is designed for use solely by Qualified Purchasers, institutional investors and consultants. It may not be disseminated to or used by individual plan participants or retail investors.

Compliance: The Capital Group Companies ("Capital Group") claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Capital Group has been independently verified for the periods December 31, 2007 to December 31, 2018. The verification report(s) is/are available upon request. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

Firm definition: The "Firm" is defined as Capital Group and includes all portfolios, excluding Capital International Private Equity Funds ("CIPEF"), managed within its subsidiaries and divisions. The Firm manages equity assets through three investment groups. These groups make investment and proxy voting decisions independently. Fixed income investment professionals provide fixed income research and investment management across the Capital organization; however, for securities with equity characteristics, they act solely on behalf of one of the three equity investment groups.

Composite: The composite consists of all discretionary portfolios that are managed to the international capital appreciation strategy with an all-countries investment focus. The strategy seeks to provide long-term growth of capital by investing in companies from all countries excluding the U.S. Composite characteristics include investments primarily in the complete range of markets outside the U.S., up to 50% in developing countries and regional weightings as a result of individual stock selection. Composite inception date is September 30, 2001. Composite creation date is December 31, 2009.

Presentation of results and fees: Composite results reflect the reinvestment of dividends, interest and other earnings. Results are net of withholding taxes on dividends, interest and capital gains. Actual withholding tax rates vary according to the country of denomination and tax status of each portfolio. Composite gross results are presented before management fees but after all trading expenses. The composite may include portfolios with gross results that reflect the deduction of certain administrative fees. Composite net results are calculated using the current highest management fees deducted from the gross results. Actual fees may vary depending on, among other things, the applicable fee schedule and portfolio size. Past performance does not guarantee future results. The starting annual management fee rate for a direct investment from a pension fund or equivalent institutional investor in the International All Countries Equity strategy is 0.70%. Other fee rates may apply depending on the investment vehicle, size of investment and investor profile.

Index: Index represents the MSCI ACWI ex. USA Index. Index results are net of withholdings taxes on dividends, interest and capital gains. Index was obtained from published sources and has not been examined by an independent accounting firm. Source: MSCI. MSCI has not approved, reviewed or produced this report, makes no express or implied warranties or representations and is not liable whatsoever for any data in the report. You may not redistribute the MSCI data or use it as a basis for other indices or investment products.

Standard deviation: The annualized three-year standard deviation measures the variability of the returns over the preceding 36-month period. Standard deviation is not presented for periods where 36 monthly composite returns are not available.

Annual composite dispersion: The composite dispersion measure presented is the asset-weighted standard deviation. This is a measurement of internal dispersion that represents the distribution of individual portfolio returns around the asset-weighted mean. Portfolios are only included in each dispersion calculation if they are present in the composite for the entire period. The asset-weighted standard deviation dispersion measure is included for full calendar years except where the composite contains five portfolios or fewer for the full year.

Number of portfolios: Periods that end with five portfolios or fewer are not presented.

Exchange rates: For periods prior to December 31, 2010, the Firm's portfolios may use the Reuters Closing Spot Rates taken at 4:00 p.m. London time or the Reuters Spot Rates taken at 11:00 a.m. Pacific time as sources for exchange rates. The majority of composite benchmarks, published by index providers, use the Reuters Closing Spot Rates taken at 4:00 p.m. London time as source for exchange rates. In addition, the Firm uses the WM Closing Spot Rates taken at 4:00 p.m. to convert composites and benchmarks from base currency into any other reporting currency.

Valuation: The Firm's valuation policy, although in accordance with the GIPS Valuation Principles, may allow for some differences among portfolios within the composite based upon whether a given portfolio adjusts the values of certain non-U.S. securities based on certain U.S. market movements.

General: A complete list and description of Firm composites and policies for valuing portfolios, calculating performance and preparing compliant presentations are available upon request.

GIPS® is a trademark owned by CFA Institute.

Institutional client notice and addendum for retirement plans

Capital Group, its affiliates and representatives (collectively “Capital Group”) engage in sales, marketing and servicing activities as part of our efforts to distribute our services and products (“distribution activities”). Our distribution activities reflect our understanding of the following:

1. The Plan is represented by a “fiduciary” within the meaning of section 3(21)(A) of ERISA with full authority and responsibility for the decision to enter into transactions or service relationships (the “Plan fiduciary”);
2. The Plan fiduciary is responsible for exercising independent judgment in evaluating any transactions or services and is capable of evaluating investment risks independently, both in general and with regard to particular transactions and investment strategies that Capital Group may market to the Plan; and
3. Capital Group is not undertaking to provide impartial investment advice, act as an impartial adviser or provide advice in a fiduciary capacity in connection with its distribution activities, and the parties agree that such activities will not be used as a primary basis for the Plan’s investment decisions.

This Notice does not apply beyond distribution activities. Thus, for example, Capital Group will act as a fiduciary and as an investment manager under ERISA to the extent provided in the terms of a participation or investment management agreement.

Crestline Investors, Inc.

Relevant Mandate: Private Debt and Opportunistic

Hired: 2004

Firm Information	Investment Approach	Total ARMB Mandate
<p>Founded in 1997 and based in Fort Worth, Texas, Crestline is an institutional alternative investment management firm with approximately \$12.0 billion* of assets under management. Crestline specializes in credit and opportunistic investments, including financing and restructuring solutions for mature private equity funds. In addition, the firm manages a multi-PM equity market-neutral hedge fund and provides beta and hedging solutions for institutional clients. The company maintains affiliate offices in New York City, London, Toronto, and Tokyo.</p> <p><small>*estimated as of 9/30/2020.</small></p> <p>Key Executives: Doug Bratton, Founding Partner/CIO Keith Williams, Managing Partner, Credit Strategies John Cochran, Partner/COO</p>	<p>Crestline believes that protecting capital will always be critical to the objective of achieving alpha relative to peers. Furthermore, investing in areas where less capital is deployed will continue to provide the best opportunity to generate better returns with less overall risk.</p> <p><u>Opportunistic Strategy (BGF):</u> The Opportunistic strategy is designed to 1) provide flexible capital solutions to mid-market and lower mid-market companies in the form of debt and/or structured equity, normally in sizes ranging from \$20 million to \$75 million, on a bilateral basis, 2) purchase high quality assets in inefficient or dislocated sectors or forced/motivated seller situations at a discount to intrinsic value, 3) lend to or create asset platforms on a bilateral basis to aggregate cash flow streams backed by assets, and 4) protect capital by consistently maintaining a controlling position and structuring investments with a combination of asset-backing, recourse to visible and predictable recurring cash flows, first ranking seniority within capital structures, and thoroughly structured well-covenanted transactions with multiple practical routes to realization.</p> <p><u>Portfolio Financing Strategy (BGF):</u> The Portfolio Financing strategy aims to achieve attractive risk adjusted returns by providing low-LTV bespoke financing solutions to mature private equity funds, collateralized by portfolio NAV. These solutions meet an array of investor, manager and portfolio company needs including, but not limited to, liquidity and growth capital.</p> <p><u>Direct Lending Strategy (SLF):</u> The Direct Lending strategy is focused primarily on senior secured, first lien lending to lower-middle and middle market companies in North America with borrowing needs between \$15-100 million.</p> <p>Benchmark: T-Bills + 5%</p>	<p>Assets Under Management: 9/30/2020: \$659.2 million</p> <p>Assets managed includes net asset values for opportunistic, portfolio financing, and direct lending mandates.</p>

Concerns: None

9/30/2020 Performance

	<u>1-Year</u>	<u>3-Year</u>	<u>5-Year</u>	<u>6-Year</u>
BGF Net IRR	1.77%	4.66%	6.09%	5.42%
Specialty Lending I Net IRR	9.57%	12.24%	12.89%	12.23%
Specialty Lending II Net IRR	10.93%	11.66%		
T-Bills + 5%	5.67%	6.61%	6.20%	6.01%

Specialty Lending I: 6-Year period represents inception to date; Specialty Lending II: 3-Year period represents inception to date.



ARMB Direct Lending Overview



MARCH 2021

Executive Summary

Firm & Team Overview

Direct Lending Market

Track Record & Performance

Specialty Lending Fund III

Appendix

Specialty Lending Fund III

- **Senior secured 1st lien lending to lower-middle and middle market companies in North America**
- Targeting 10% – 13% net IRR (levered fund) and 7% – 9% net IRR (unlevered fund)
- Seeking to raise \$2 – \$2.5 billion in total (levered and unlevered) for the third vintage of the strategy
- 11 transactions consummated to date with one payoff at a 48.9% realized IRR and 1.11x realized MOIC
- 9.2% unlevered expected yield, 40% weighted average LTV, and 100% of the portfolio with maintenance covenants
- GP commitment: minimum of \$25 million

Investment Strategy

- **Focus on industries with recurring revenues, multi-site businesses for risk mitigation and/or asset backing**
- SLFIII will aim to make 40 – 60 cash yielding loans over the life of the fund with a focus on capital preservation
- Targets 90%+ 1st lien risk, with 95%+ cumulative 1st lien exposure since inception through 12/31/2020
- Targets less competitive landscape for opportunities between \$15 – \$100mm
- Highly structured investments with maintenance covenants, negative controls and conservative attachment points
- Five-year loans with floating rates, quarterly cash distributions, and average principal repayment of 2-3 years

Team

- **25 US investment professionals with significant credit experience, industry specializations, distressed investing acumen, and restructuring expertise**
- Core team worked together at Goldman Sachs Special Situations Group (“GS SSG”) from 2004 through the global financial crisis (“GFC”), with over 100 transactions consummated to date
- Sponsor-agnostic, industry focused origination model creates differentiated direct deal sourcing network
- 32% of investment team members have extensive workout and restructuring experience

Track Record

- **SLFI is the top performing 2014 vintage direct lending fund in North America** (per Preqin as of Nov. 2020¹)
- 12%+ net IRR in both SLFI and SLFII² (as of 9/30/2020)
- Generated “Direct Alpha” outperformance of 5.32% in SLFI and 6.36% in SLFII over the benchmark index³
- 38 realizations to date with a weighted average gross IRR of 14.2%⁴
- 0.6% annualized default rate and 0.0% realized loss rate across the strategy to date

As of 12/31/20 unless otherwise noted. Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor’s return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses.

¹Resulting from the following screen in Preqin database: Private Capital Benchmarks> North American Direct Lending> 2014 Vintage. Preqin is a leading provider of data, analytics and insights to the alternative assets community. ²Net of fees as of 9/30/20. SLFI launched on 10/1/14; SLFII launched on 8/1/17. The blended net IRR in SLFI is 12.15% vs. the lowest reported net IRR of 12.06% in the US Feeder. The blended net IRR in SLFII is 12.08% vs. the lowest reported net IRR of 11.66% in the US Feeder. ³As of 9/30/20. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders. Please see performance notes and disclosures for a summary of Direct Alpha methodology. Benchmark used for analysis is BAML US HY MASTER II TR which is unlevered. ⁴Gross-of-fee IRR performance figures represent deal level performance and do not include the deduction of fund level fees and expenses and do not represent the performance of any investor. An individual investor’s returns will be reduced by advisory fees and other expenses incurred in the management of its account. Past performance is not indicative of future results.

Firm & Team Overview

Firm Background

- Founded **over 20 years** ago to focus on alternative investment strategies for the Edward P. Bass family
- In **2001** the firm opened its doors to outside investors
- **#1** mission is to provide attractive risk-adjusted returns for sophisticated asset owners

Experienced Management Team

- **139¹** employees leveraging our credit and equity expertise and innovative products to pursue value creation in global markets
- **70-member** investment team with broad experience across geographies and asset classes
- **Six** partners with over **185 years** of alternative investment and credit experience
- Credit strategies partners, **Keith Williams** and **Chris Semple**, have experience in liquid/illiquid credit investing, distressed investing, restructuring and turnaround advisory, and private markets sourcing and execution.

Innovative Organization

- **15** specialized opportunistic funds launched to date
- **\$4.0 billion** deployed in over 100 transactions across Crestline credit strategies
- **\$12.0 billion²** of AUM across Crestline's affiliated investment teams

¹ as of 1/31/2021

² AUM for Crestline Investors, Inc., its affiliates and its affiliated management team is estimated at \$12.0 billion, which includes uncalled capital commitments and \$2.9 billion of beta overlay notional amounts. The above estimate is based on valuations as of 9/30/2020 for certain assets managed by Crestline affiliates, which are valued as of earlier dates based on the most recently available data for such assets. AUM for the Specialty Lending Funds may include leverage.



*Shaded box indicates
Investment Committee
Member

- Crestline's direct lending investment committee brings over **155 years** of investing experience across multiple asset classes
- US core credit / opportunistic team has been together for over **10 years** in the US, beginning at Goldman SSG
- Keith Williams and Chris Semple collectively have **40+ years** of investing experience
- Senior investment professionals average **23 years** of experience
- Senior team has significant distressed and workout experience

TEAM CONTINUITY

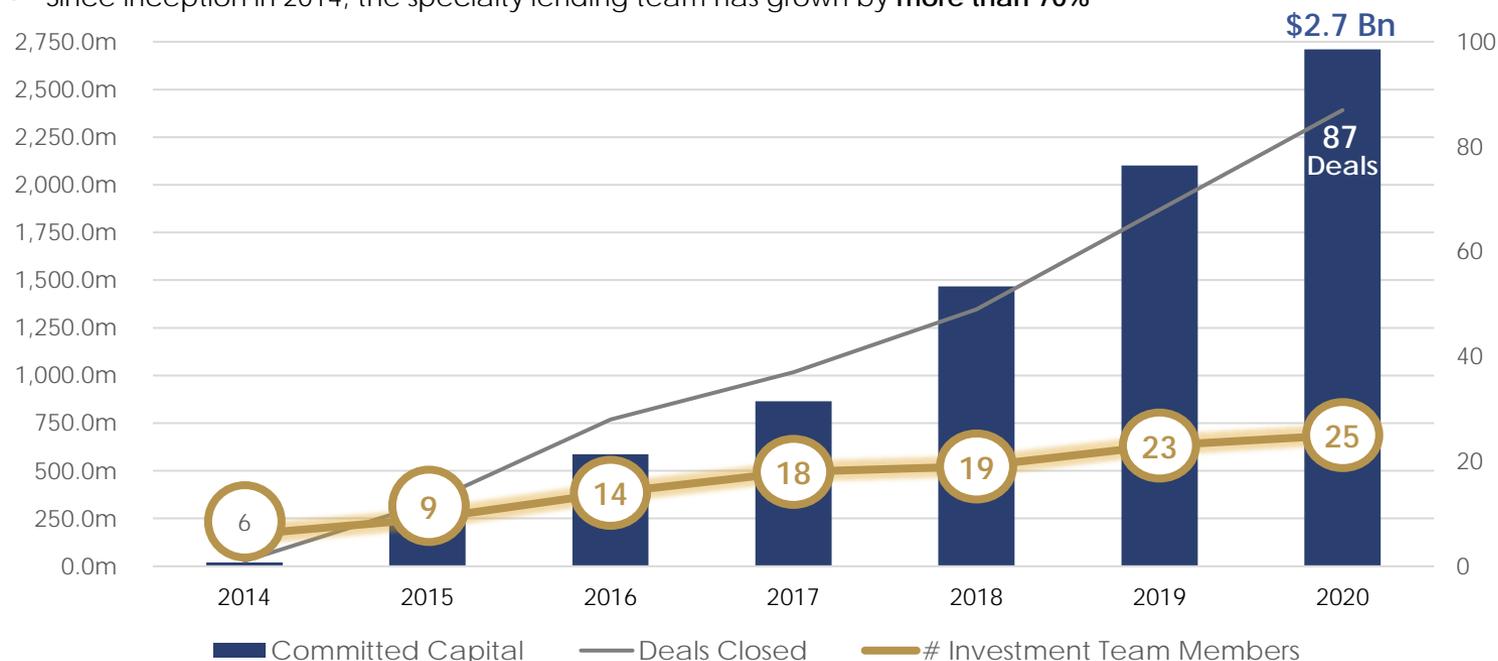
- **Core team** worked together at Goldman Sachs SSG dating back to 2004 and through the global financial crisis
- **Same philosophy:** *capital preservation, first dollar risk, structural protections, risk-adjusted returns*
- **100+** transactions at Goldman and Crestline, respectively among private credit strategies
- Specialty Lending & Opportunity Funds run by the **same team**, creating a wider lens to source and structure transactions

RESTRUCTURING EXPERTISE

- **Eight** US investment professionals (32% of team) with prior experience at prominent restructuring / turnaround firms
- **Restructuring experience** supports robust asset management process and helps to maximize recoveries in a downturn
- **Five** US investment professionals (20% of investment team) have distressed investing acumen and experience

CONTINUED GROWTH

- Since inception in 2014, the specialty lending team has grown by **more than 70%**



INDUSTRY FOCUS

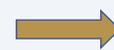
- We believe industry specializations drive better sourcing and execution
 - Deep industry sourcing networks creates first call advantage
 - Sector specializations enhance certainty of execution and speed to close
- Ten industry focused senior US investment professionals¹ possess 19 years of average industry experience

NUMBER OF DEALS CLOSED ACROSS PRIVATE CREDIT IN REPRESENTATIVE INDUSTRIES¹: (2014 - 2019)



DIFFERENTIATED SOURCING CHANNELS:

SOURCED¹
3,339



CLOSED
55



RATE
1.6%

(2016 - 2019)



- One team culture across private credit strategies creates cross-platform sourcing opportunities
- Sponsor agnostic – indifferent whether potential investments are sponsor or non-sponsor backed
- Specialist approach creates deep industry relationships which generate higher quality deal flow
- Regional sponsor, investment banking and advisor coverage compliments industry specialists

DIFFERENTIATED SOURCING

¹ Includes both Specialty Lending and Opportunistic assets.

Direct Lending Market

Traditional Middle Market Capital Structures

- Senior secured debt is the least risky part of a company's capital structure because losses are first absorbed by the equity and junior debt holders before impacting the senior debt holders

Security Type	Description	Typical Portion of Capital Structure	Risk	Return Expectations
Senior Secured Debt	Priority lien on assets, amortization, quarterly cash coupon	50%	Low	3-11%
Junior Debt	Junior lien; or unsecured, junior to all liens	20%	Medium	12-16%
Equity	Subordinate to all debt, own the Company	30%	High	20%+

Finco's (non-bank lenders)

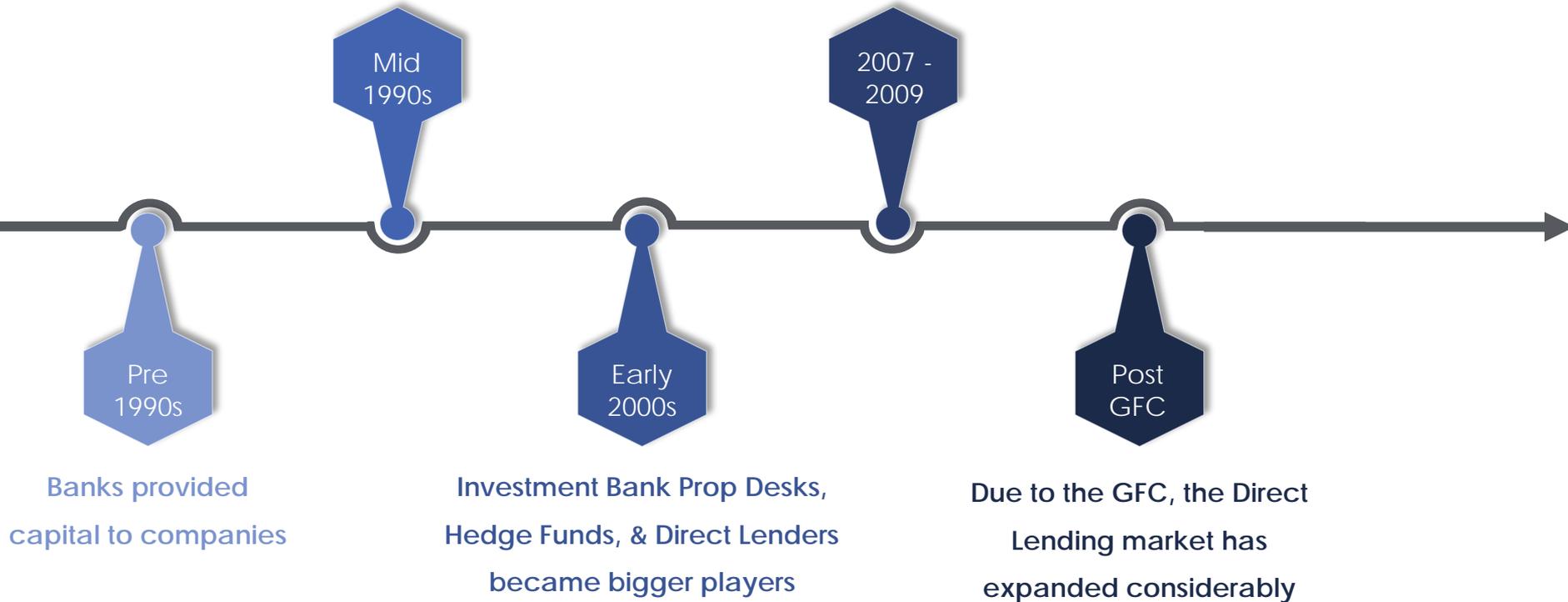
entered the market

- GE Capital
- Heller
- CIT
- Congress
- Allied
- Foothill

GFC caused tremendous strain on

Direct Lending ecosystem

- Bank regulation constrained regulated banks
- Investment Banks became banks (*see above*)
- Hedge Funds encountered asset/liability mismatch issues (*short term money / long term obligation to lend*)
- Finco's became more regulated as well



Senior secured loans to middle market borrowers have compelling investment characteristics

- Historically have exhibited minimal loss rates through low defaults and high recoveries
- Loans have significant downside protection
- Highly structured transactions with covenant packages to enhance lender's recovery
- The loans are floating rate, so they adjust with changes in short-term interest rates

- The middle market lending universe is large and is the most fragmented of all corporate lending opportunities
- Middle market direct loans typically have senior secured liens with highly negotiated loan documents resulting in far superior risk protection
- Notwithstanding better risk mitigation, middle market direct loans are generating a premium return

Characteristic	Middle Market Direct Loans	Syndicated Bank Loans	Short Duration High Yield	High Yield
Market Size	>\$1.2 trillion ¹	\$1,191 billion ²	\$606 billion ²	\$1,460 billion ²
Description	<ul style="list-style-type: none"> • Typically senior secured/unitranche lending to middle market corporations 	<ul style="list-style-type: none"> • Typically senior secured lending to large corporations 	<ul style="list-style-type: none"> • Unsecured lending to large non-investment grade corporations, maturity less than 5 years 	<ul style="list-style-type: none"> • Unsecured lending to large non-investment grade corporations
Expected Return	8-12% ¹	4 – 6% ³	4 – 5% ³	4 – 6% ³
Expected Loan-to-Value	Up to 65%	Up to 60%	Up to 75%	Up to 75%
Rate Exposure	Typically Floating	Floating	Fixed	Fixed
Loan Duration (years)	2.5	2.5	2.1 ⁴	3.7 ⁴
Liquidity	Low	Medium to High	High	High

1. Source: Crestline estimate. 2. Source: S&P LCD, Barclays Research (as of November 18, 2020). 3. Source: Historical returns through 4Q 2019, per Barclays Research and JP Morgan Research. 4. Effective duration per BofA Research (as of November 9, 2020).

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or prediction of any particular performance.

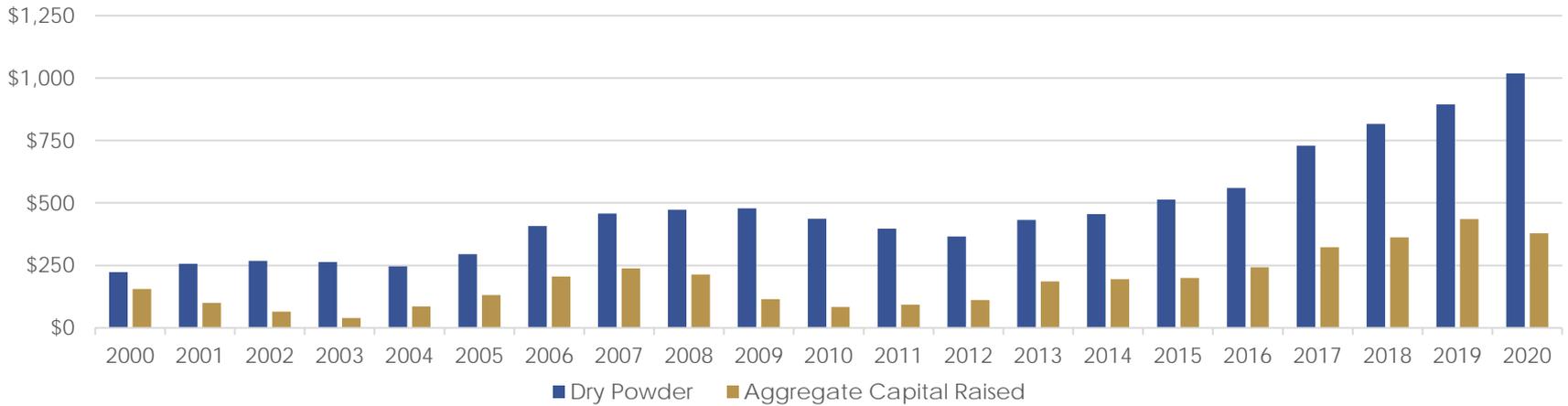
- The low interest rate environment, benign default rates, and significant private debt capital raising have driven escalating competitive dynamics among lenders.
- Debt financing providers across the Upper Middle Market and Syndicated Loan Market have lowered interest rates, loosened credit protections, weakened structures and increased leverage levels to near-historic highs.
- The lower-middle market has remained relatively insulated from these pressures.

Characteristic	Typical Crestline Loan	Upper Middle Market / Syndicated Loan
Total Leverage (including 2 nd Lien/Junior Debt)	~4.1x	~5.3x
Call Protection	2 - 3 Years	6 months; soft call only
Financial Covenants	20.0% – 30.0% covenant cushions; Agent maintains control on approving EBITDA add-backs; significant de-levering required through covenant step-downs	+35.0% covenant cushions; ability to net unlimited cash; flexibility surrounding EBITDA add-backs; 80.0% cov-lite; minimal required de-levering
Negative Covenants	Full cash trap, no cash or asset “leakage” allowed, limitations on permitted acquisitions, minimal sub debt or junior debt allowed	Minimal restrictions on dividends; unlimited acquisitions, significant re-levering of the business possible
Collateral Package	First lien on all wholly owned subs and equity pledge; full cash control/lien	First lien on all assets; ability to move assets into unrestricted subs; no lien on cash
Most Favored Nations Interest Rate Protection	Yes/not applicable as Crestline has control of loan	Possible sunset within 12 months; otherwise, reset to within 50bps of newly priced tranche

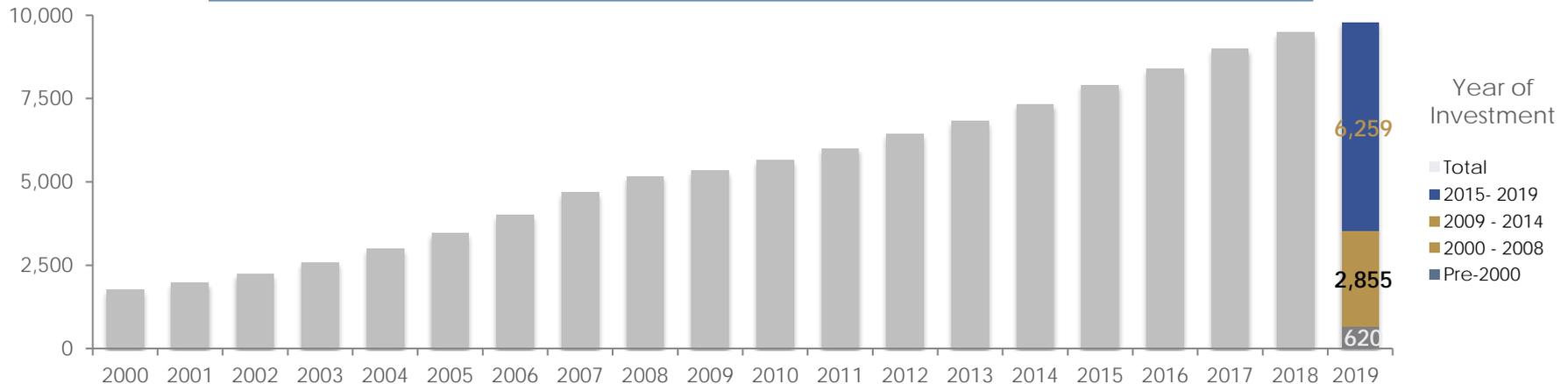
M&A Activity Drives Demand for Direct Loans

- Private equity dry powder continues to increase, as do refinancing opportunities in existing private equity portfolio companies
- Larger private equity dry powder creates the need for more debt capital providers, especially as banks withdraw
- For every ~\$1 of equity capital invested, roughly \$2 of debt capital required

NORTH AMERICAN PE FUNDRAISING & DRY POWDER (\$B)



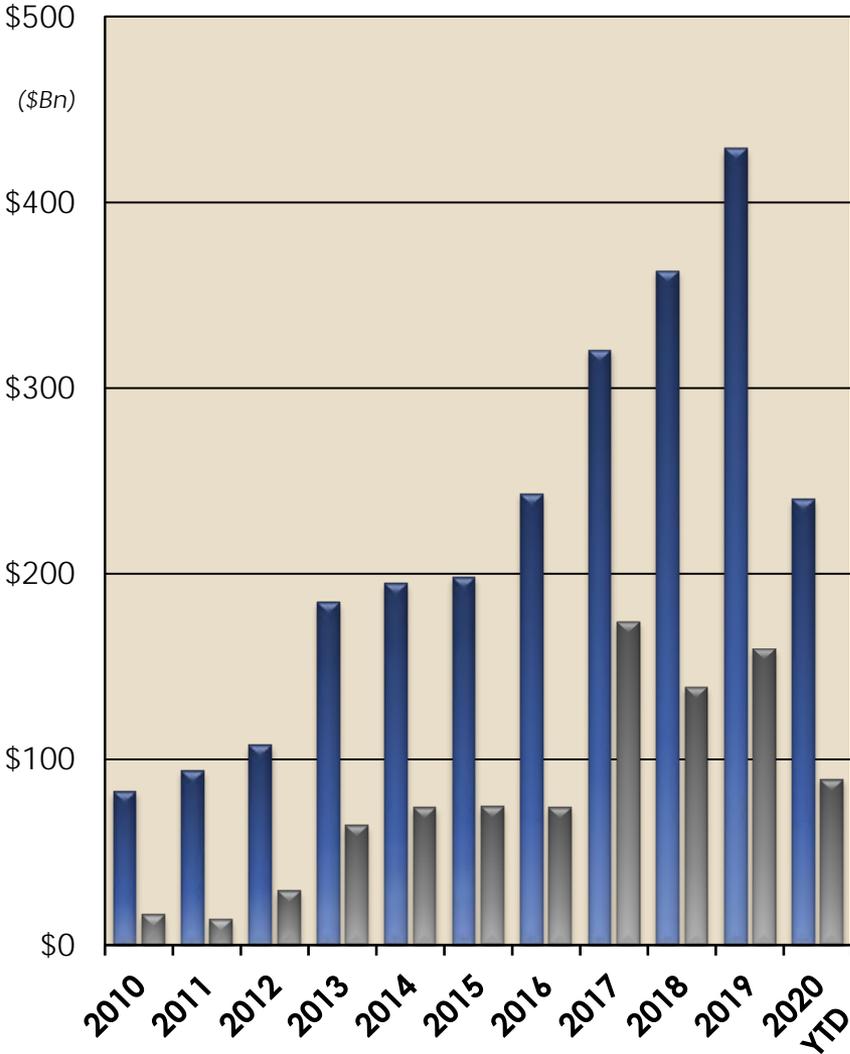
U.S. PE-BACKED COMPANY INVENTORY BY COUNT & YEAR



Sources: Preqin (*as of November 2020), Pitchbook
See Notes to Performance History & Comparisons for further information.

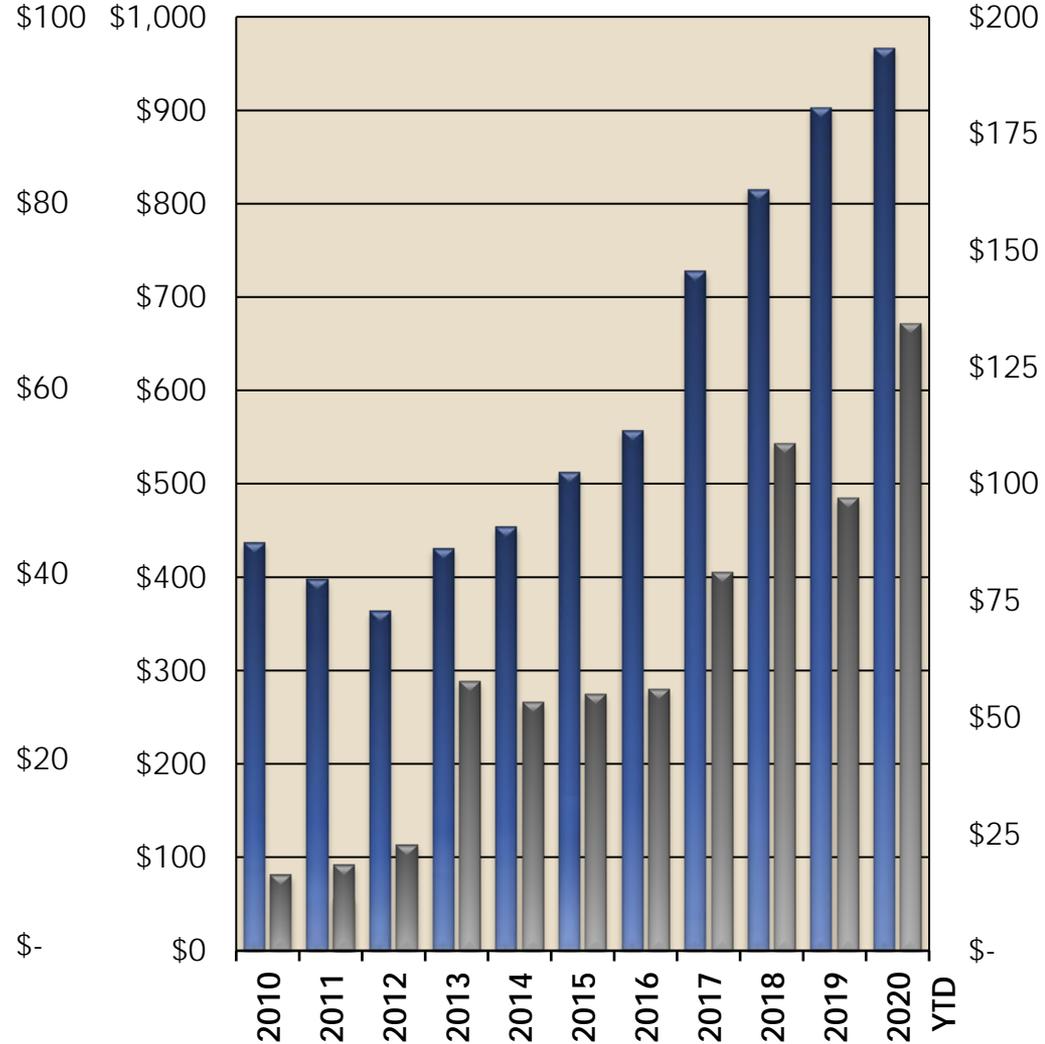
Total Capital Raised (North America)

■ Private Equity (\$bn, left) ■ Direct Lending (\$bn, right)



Total Dry Powder (North America)

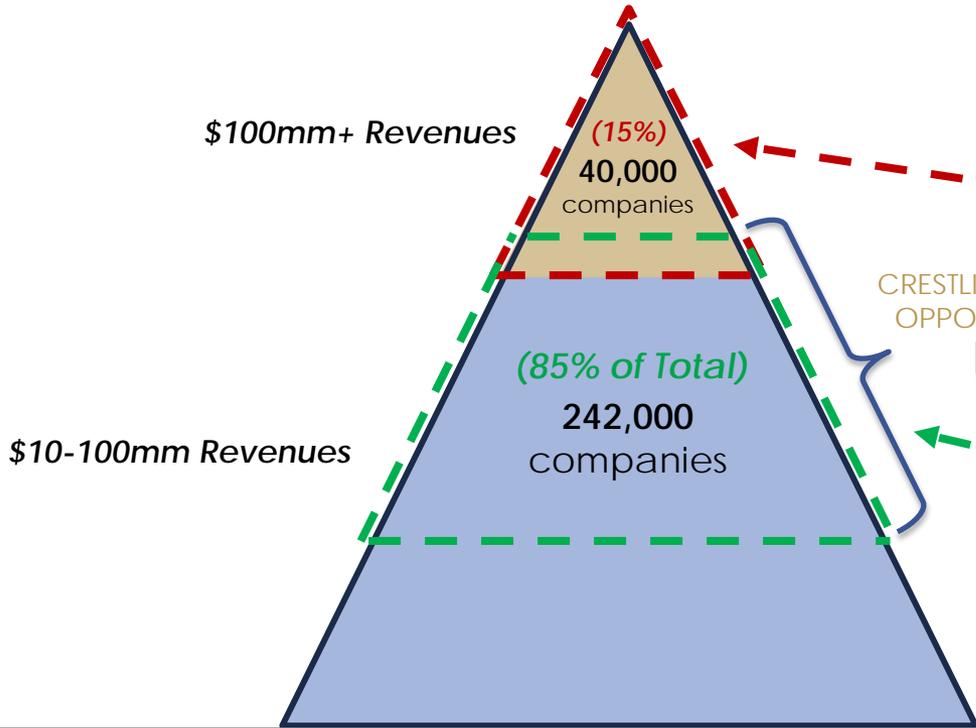
■ Private Equity (\$bn, left) ■ Direct Lending (\$bn, right)



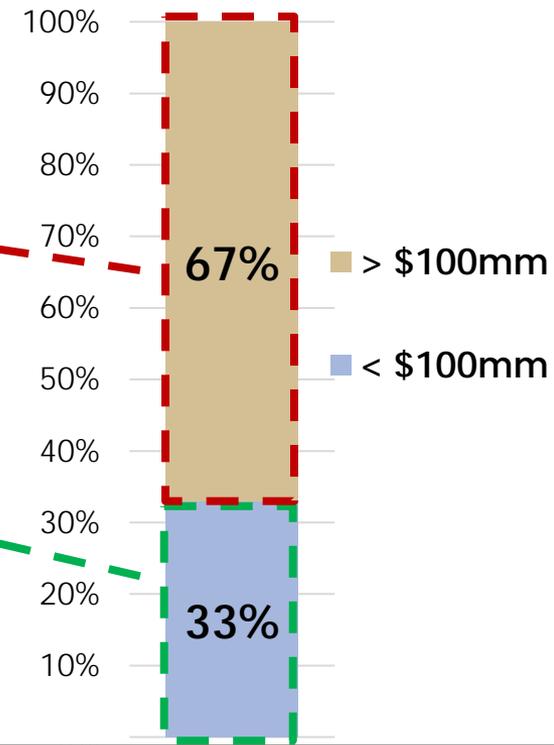
Source: Preqin (YTD through 10/20/2020)

- Almost 70% of the capital that has been raised is seeking ~15% of the total opportunity set³
- The areas in which Crestline’s Specialty Lending Funds focus have more companies and as a result, more available lending opportunities
- With the majority of capital targeting a smaller and more crowded opportunity set at the upper end of the middle market, the lower-middle market has remained a less competitive lending environment

Companies in the US and Canada¹

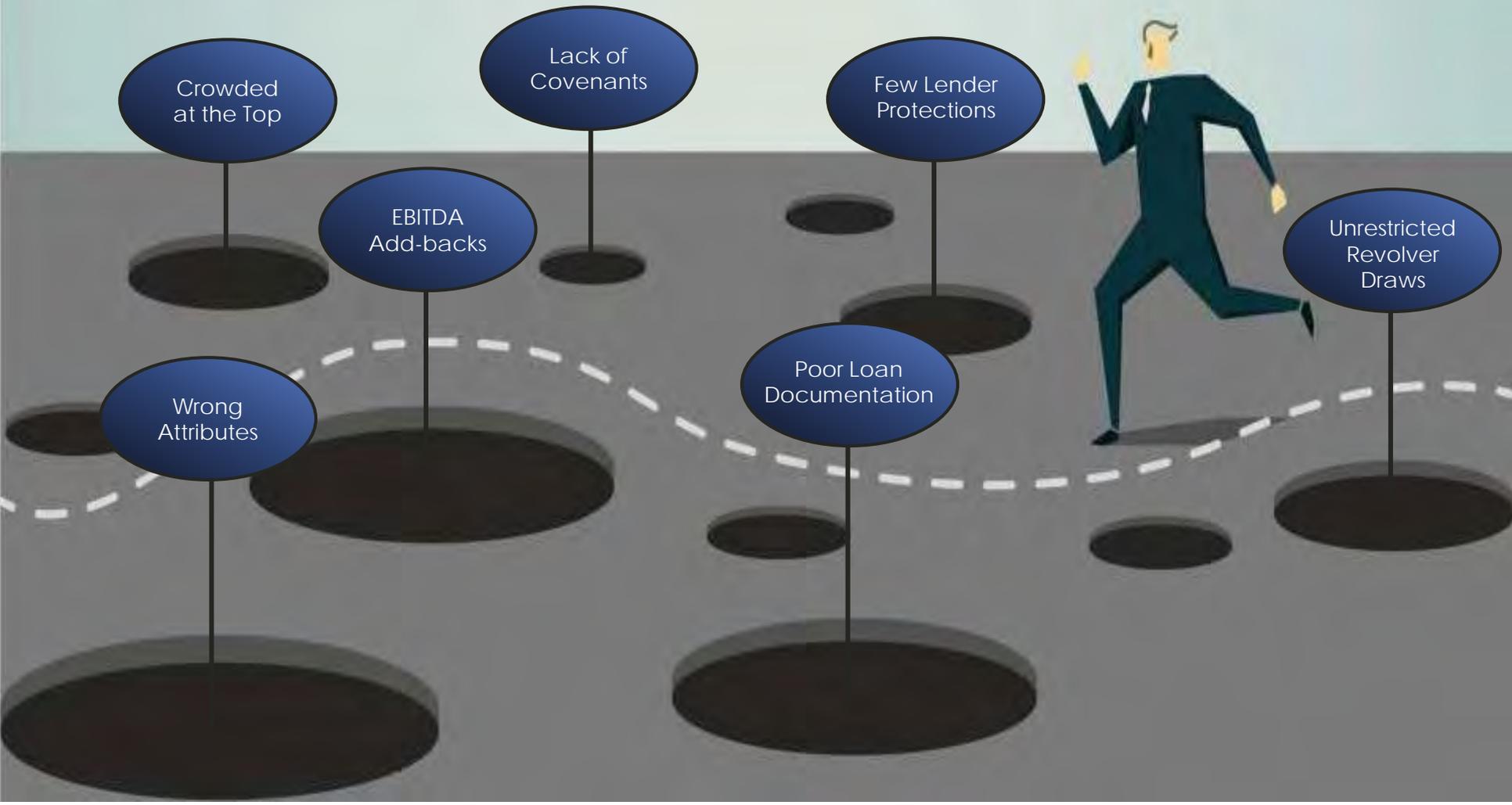


Capital Raised by Target Borrower Size²

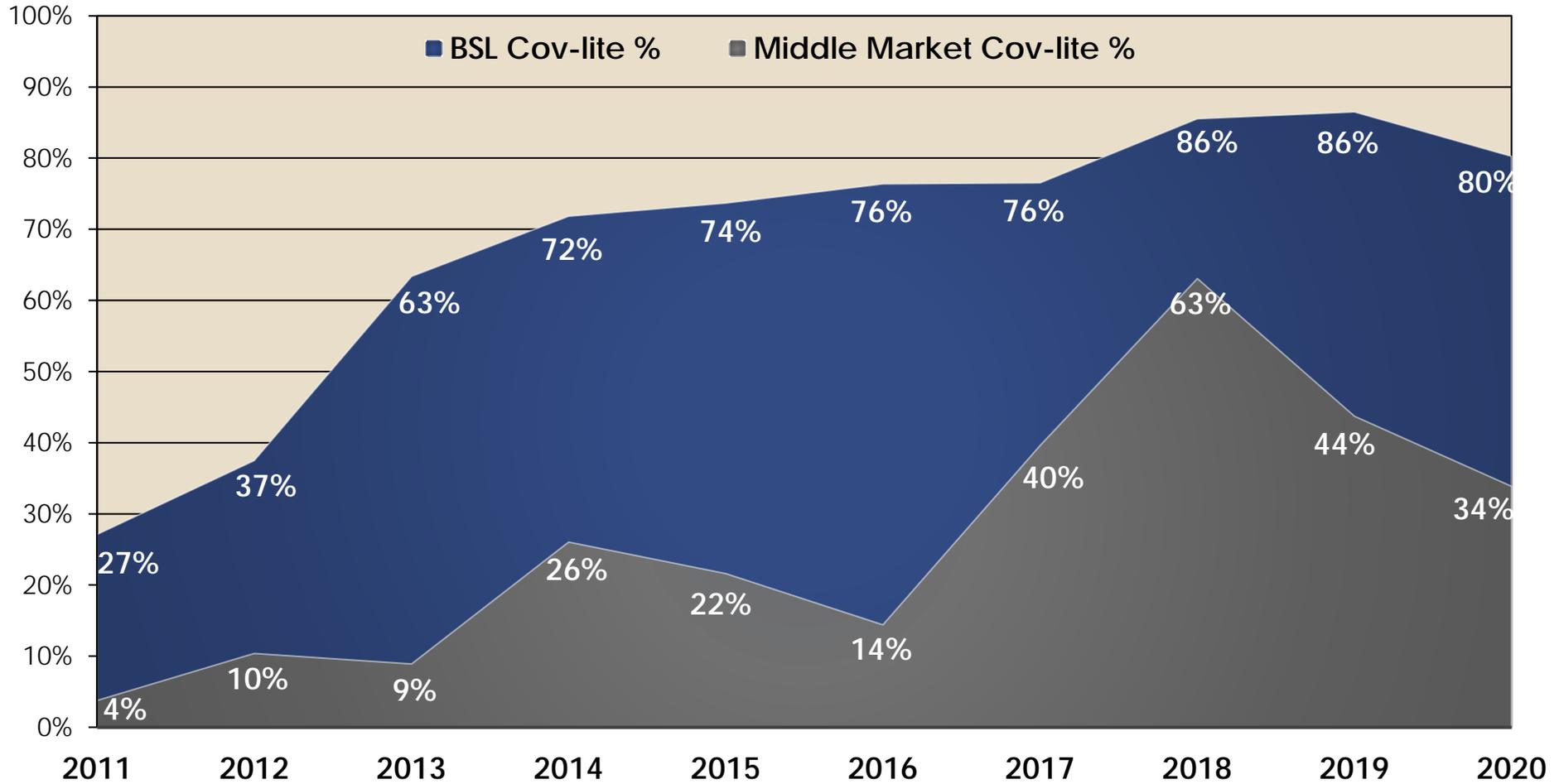


Sources: ¹Mergent Intellect; ²Prequin Private Debt data for Direct Lending and Mezzanine funds between 2013 – 2017. ³Represents Crestline estimates; funds targeting companies with EBITDA from \$5mm – \$250mm+. Please see important information at the end of this document regarding disclosures, forward looking statements, etc.

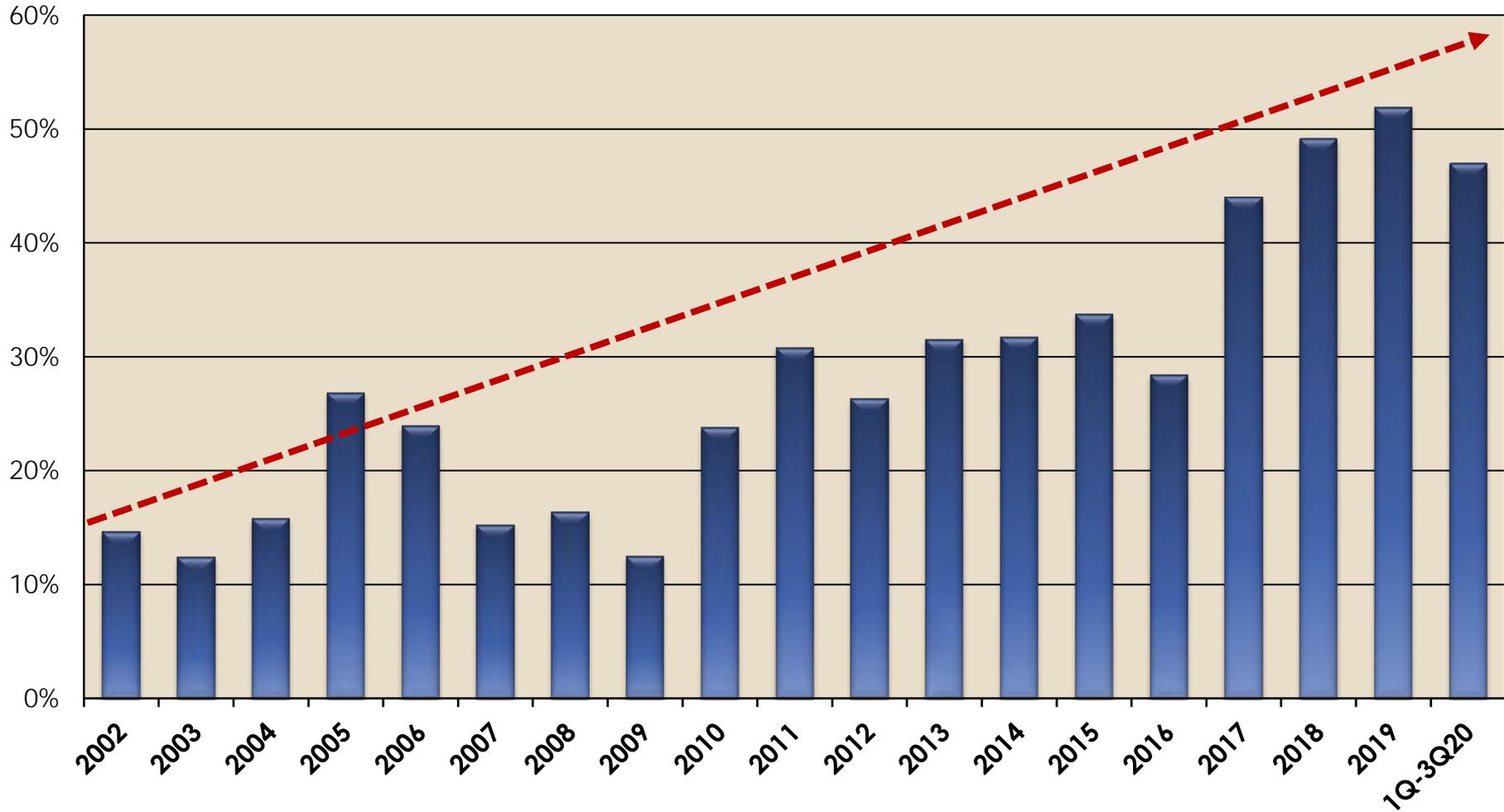
Sponsors today are dictating terms through the auction process, leading to lending pitfalls...



Percentage of Covenant Lite Loans

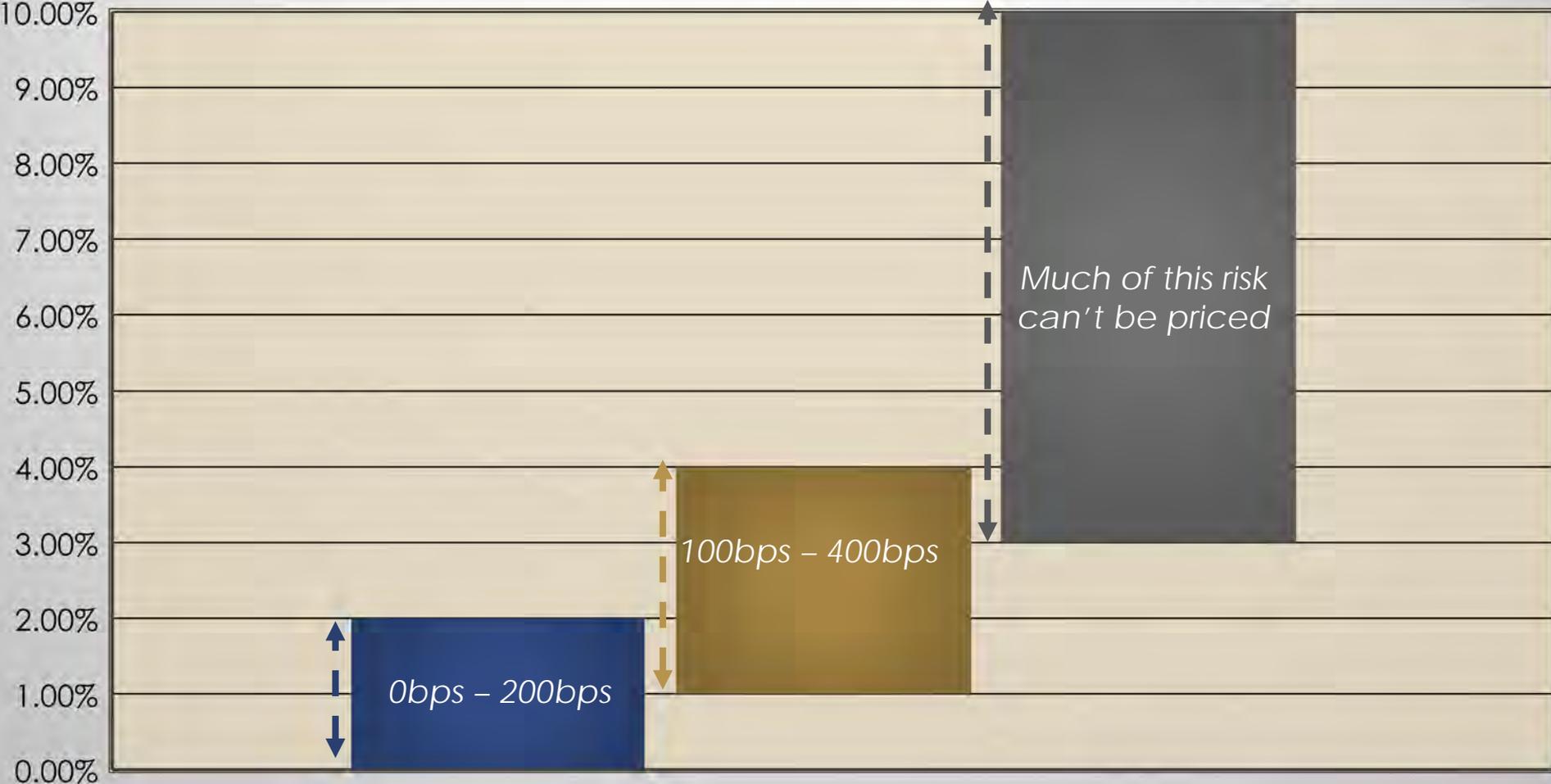


M&A Transactions with EBITDA Adjustments



Post-COVID Middle Market Loan Spread Premiums*

■ Limited COVID risk ■ Moderate COVID risk ■ Severe COVID risk

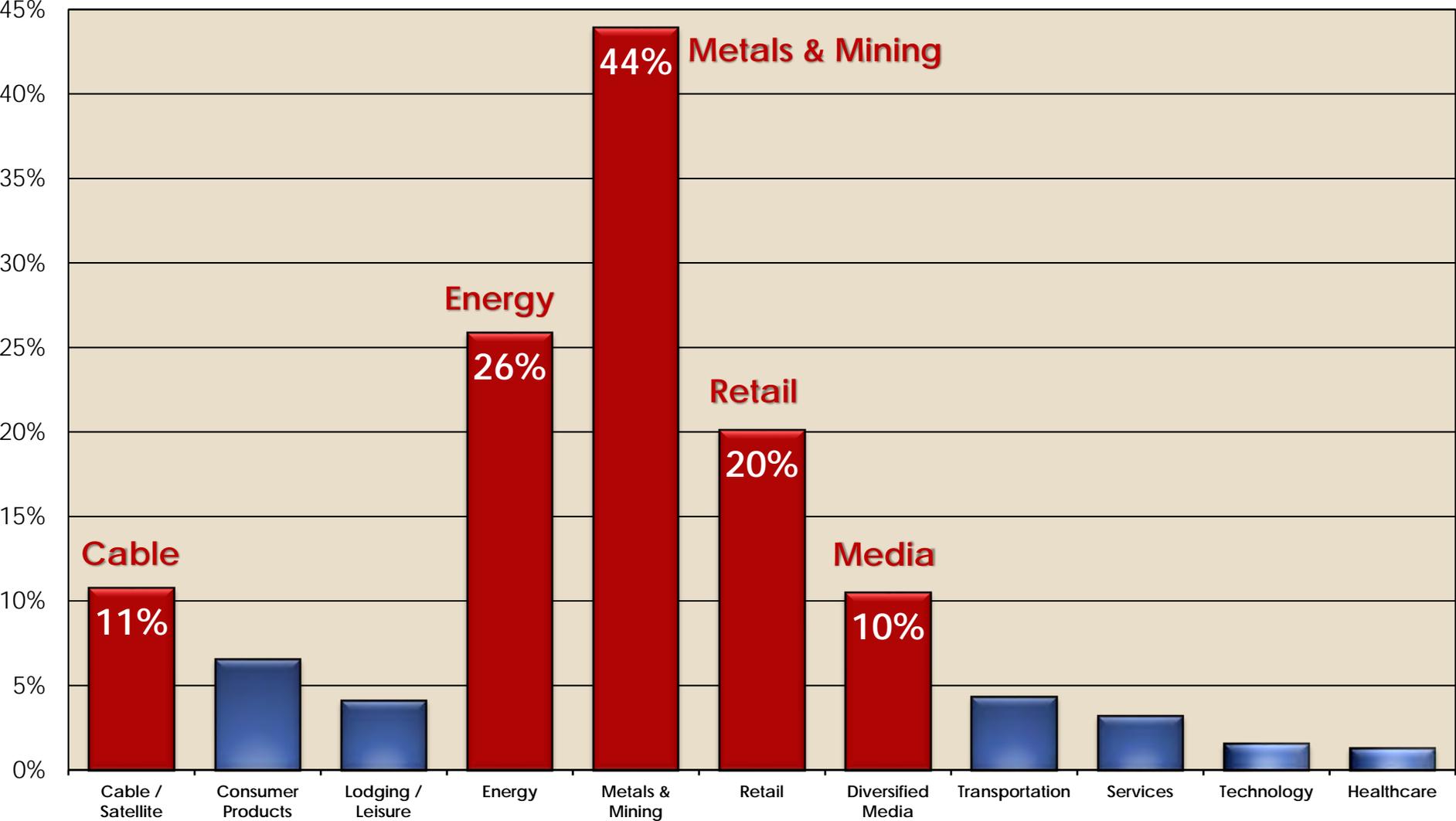


*Crestline estimates

1st lien senior secured loans to middle market companies in North America with at least one of our three core attributes:

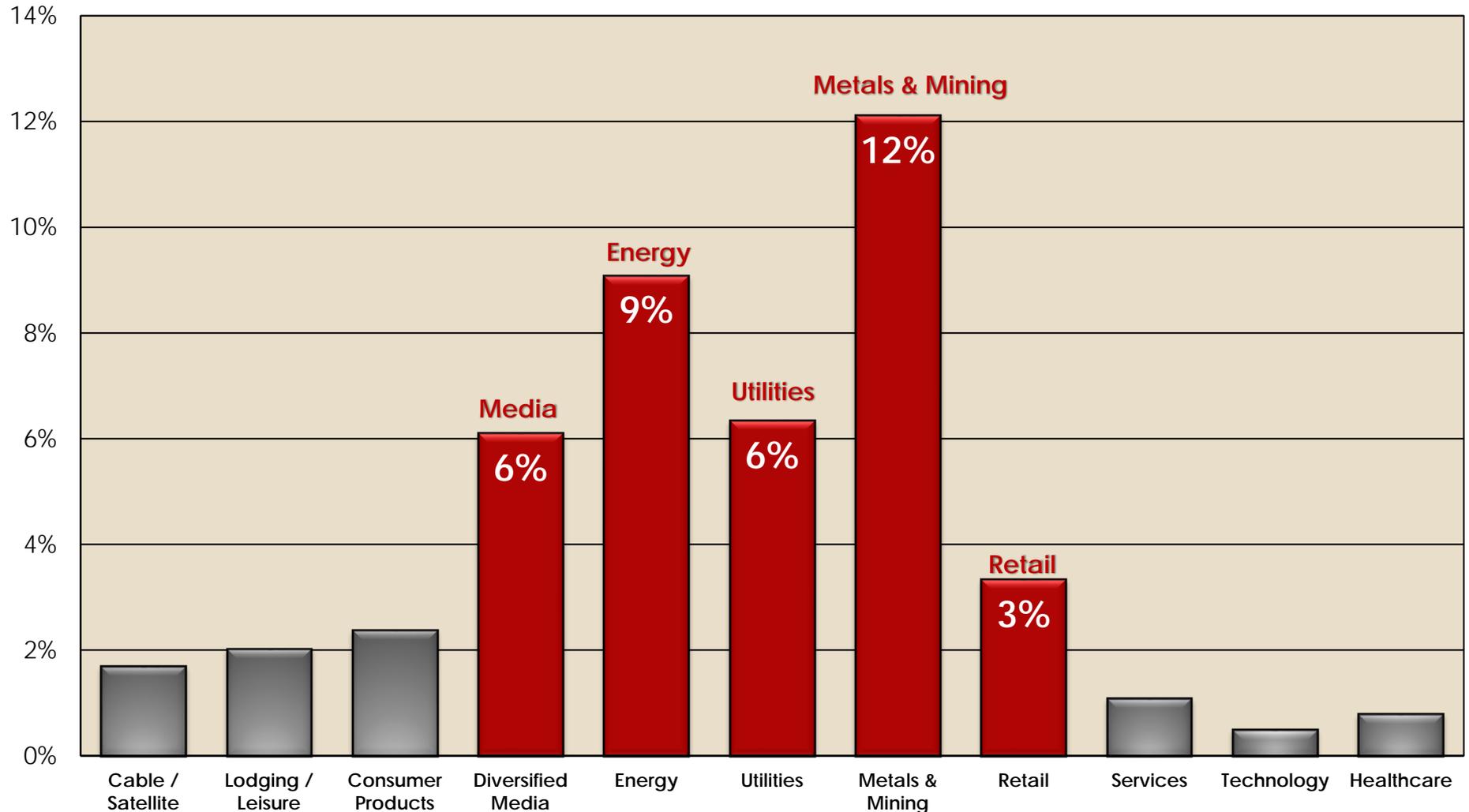
THREE CORE ATTRIBUTES	1 RECURRING REVENUE	2 MULTI-SITE / DISCRETE POOLS OF VALUE	3 SPECIALTY FINANCE
DESCRIPTION	<ul style="list-style-type: none"> • Recurring or multi-year contractual revenue • Businesses models and services with high retention rates • Mission critical in nature 	<ul style="list-style-type: none"> • Ideally businesses with 15+ locations, each with its own cash flow stream • Businesses with separable pools of value and diverse revenue streams • No consumer product retail 	<ul style="list-style-type: none"> • Lending against, purchasing or creating a financing program • Unbanked or under- banked consumer SMEs • Portfolio of assets with a cash flow stream attached
DOWNSIDE PROTECTION	<ul style="list-style-type: none"> • Defensible/predictable cash flow streams • Ability to underwrite attrition/retention rates creates longer term value • Mission critical attributes create high switching costs and sticky customers • Industry growth tailwinds provide exit opportunities 	<ul style="list-style-type: none"> • Ability to restructure around profitable locations or lines of business • Optionality to shut down/sell off unprofitable locations in harvest case • Independent asset or business line sales provide risk mitigation • Multiple exit options 	<ul style="list-style-type: none"> • Asset coverage and eligibility boxes mitigate principal risk • Shorter duration, self amortizing • Investing inside of asset value or in assets with basis de-risking attributes • Multiple exit options including amortization, refinancings from more traditional providers, and portfolio sales / securitizations
INDUSTRY EXAMPLES	<p style="text-align: center;"> SOFTWARE DATA CENTERS ALARM MONITORING TECH-ENABLED SERVICES PAYMENT PROCESSING BUSINESS SERVICES </p>	<p style="text-align: center;"> HEALTHCARE SERVICES OUT-OF-HOME MEDIA BUSINESS-TO-CONSUMER WASTE MANAGEMENT EDUCATION </p>	<p style="text-align: center;"> LEASING FACTORING MERCHANT CASH ADVANCE SMALL BUSINESS/CONSUMER LENDING TRANSPORTATION FINANCE TRADE FINANCE </p>

Leveraged Loan LTM Default Rates by Industry



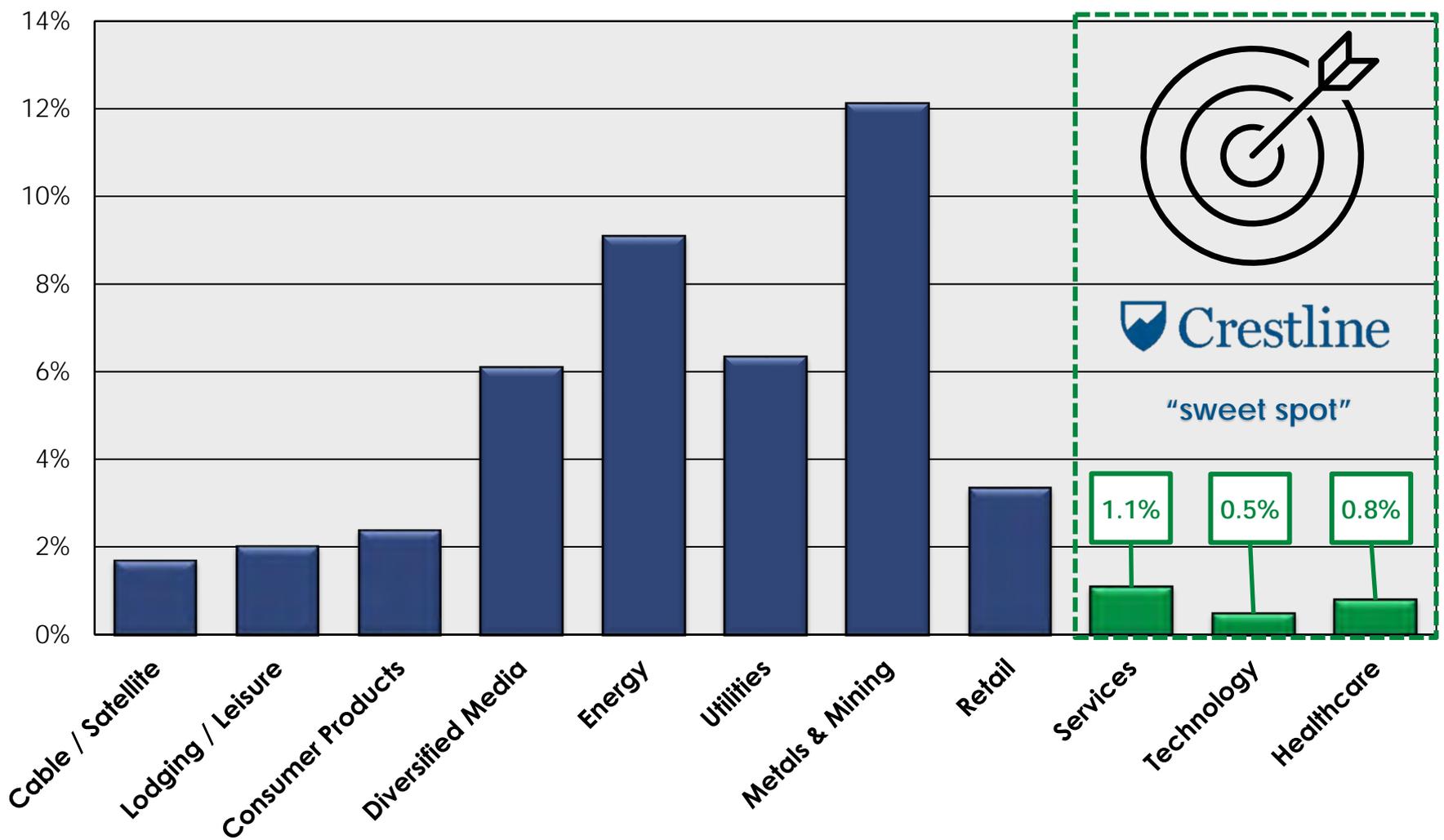
Source: JPMorgan Default Monitor (October 2020)

Leveraged Loan 10-Year Average Default Rates by Industry



By focusing on our three core attributes, we are intentionally investing in areas with a lower default rate on average

Leveraged Loan 10-Year Average Default Rates by Industry



Source: JPMorgan Default Monitor (October 2020)

Track Record & Performance

Crestline's Specialty Lending Funds have outperformed the market with greater controls and less leverage.

- The combination of capital preservation (95% first dollar risk / 50% LTV attachment points) and attractive risk-reward characteristics (787 bps combined spread over LIBOR) helps to set Crestline apart as the **top performing direct lending manager in its first vintage fund**¹
- Across our history, Crestline has only experienced one payment default in our direct lending funds
- Crestline's leverage multiples are lower than representative peers with higher asset level returns
- Crestline's emphasis on capital preservation is evident in our structuring and loan documentation, with three maintenance covenants on average and substantial negative controls

	Q3 2020 Return	Average Spread over LIBOR	Loss Rate	Percent True First Lien	Maintenance Covenants Percentage	Average Number of Covenants	U/W LTV	Exit LTV	Average Leverage Multiple	Current Yield	Yield to 3-year Takeout
SLFI*	12.2% ²	790 bps	0%	95%	100%	3.1	56%	44%	4.2x	10.2%	10.6%
SLFII*	12.1% ³	789 bps	0%	96%	100%	2.7	46%	55%	4.2x	9.8%	10.0%
SLFIII*	n/m ⁴	723 bps	0%	100%	100%	2.5	41%	39%	4.4x	n/a	9.3%
Middle Market	7.3% ⁵	575 bps ⁶	n/a	n/a	~70%**	n/a	n/a	n/a	5.1x ⁶	6.8% ⁶	n/a
BDC Market	4.2% ⁷	591 bps ⁸	n/a	70% ⁷	n/a	n/a	n/a	n/a	n/a	9.5% ⁷	n/a

All data as of 12/31/2020 unless otherwise noted. Fund level metrics are shown on a cumulative committed capital basis.

*SLFI launched on 10/1/2014; SLFII launched on 8/1/2017; SLFIII launched on 7/1/2020 **Denotes Crestline estimate.

The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the fund and whether the investor is subject to certain fees and expenses.

¹Per Preqin as of Jan-21; Resulting from the following screen in Preqin database: Private Capital Benchmarks> North American Direct Lending> 2014 Vintage. Preqin is a leading provider of data, analytics and insights to the alternative assets community. ²IRR net of fees as of 9/30/2020. The lowest reported net IRR in SLFI is 12.06% in the US Feeder. ³IRR net of fees as of 9/30/2020. The lowest reported net IRR in SLFII is 11.66% in the US Feeder. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders. ⁴n/m – not meaningful; Fund performance is calculated based on IRR. We believe the IRR calculation in the early stages of a fund is not meaningful because it is not reflective of the IRR that will ultimately be achieved over the life of the fund. We commence reporting IRR as the funds mature to at least 30% invested or fewer than 24 months remain in the investment period. ⁵Cliffwater Direct Lending Index (CDLI) 5-year Total Return (as of 9/30/2020). ⁶LCD, an offering of S&P Global Market Intelligence (as of Jan-21). ⁷Cliffwater BDC Index (CWBDIC): 5 year Annualized Total Return as of 9/30/2020; Asset seniority as of 9/30/2020; current yield as of 2/3/2021. ⁸LCD 2Q 2020 BDC Wrap (all first lien loans as of 6/30/2020).

Crestline has consistently met its targeted returns and portfolio composition since the strategy's inception.



TARGET NET RETURNS: 10% – 13%

- Specialty Lending Fund I: **12.2% net**¹
- Specialty Lending Fund II: **12.1% net**²
- Specialty Lending Fund III: **n/m**



TARGET LEVERAGE: < 4.5%

- Specialty Lending Fund I: **4.2x**
- Specialty Lending Fund II: **4.2x**
- Specialty Lending Fund III: **4.4x**



TARGET ASSET UNLEVERED RETURN: 9% – 12%

- Specialty Lending Fund I: **13.4%**³
- Specialty Lending Fund II: **12.1%**³
- Specialty Lending Fund III: **9.2%**⁴



TARGET U/W YIELD TO 3-YR TAKEOUT: 10%

- Specialty Lending Fund I: **10.6%**
- Specialty Lending Fund II: **10.0%**
- Specialty Lending Fund III: **9.3%**



TARGET FIRST LIEN DEBT: > 90%

- Specialty Lending Fund I: **95.0%**⁵
- Specialty Lending Fund II: **95.8%**⁵
- Specialty Lending Fund III: **100.0%**⁵



TARGET ANNUALIZED DEFAULT RATE: < 1.5%

- Specialty Lending Fund I: **0.0%**
- Specialty Lending Fund II: **1.0%**
- Specialty Lending Fund III: **0.0%**



TARGET U/W LOAN-TO-VALUE: ~50%

- Specialty Lending Fund I: **55.7%**
- Specialty Lending Fund II: **45.7%**
- Specialty Lending Fund III: **41.2%**



TARGET ANNUALIZED LOSS RATE: < 1%

- Specialty Lending Fund I: **0.0%**
- Specialty Lending Fund II: **0.0%**
- Specialty Lending Fund III: **0.0%**

As of 12/31/2020 unless otherwise stated. SLFI launched on 10/1/2014; SLFII launched on 8/1/2017. SLFIII launched on 7/1/2020. Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance.

The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses. n/m – not meaningful; Fund performance is calculated based on IRR. We believe the IRR calculation in the early stages of a fund is not meaningful because it is not reflective of the IRR that will ultimately be achieved over the life of the fund. We commence reporting IRR as the funds mature to at least 30% invested or fewer than 24 months remain in the investment period. ¹ As of 9/30/2020. The lowest reported net IRR in SLFI is 12.06% in the US Feeder. ² As of 9/30/2020. The lowest reported net IRR in SLFII is 11.66% in the US Feeder. Past performance is not indicative of future results. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders.

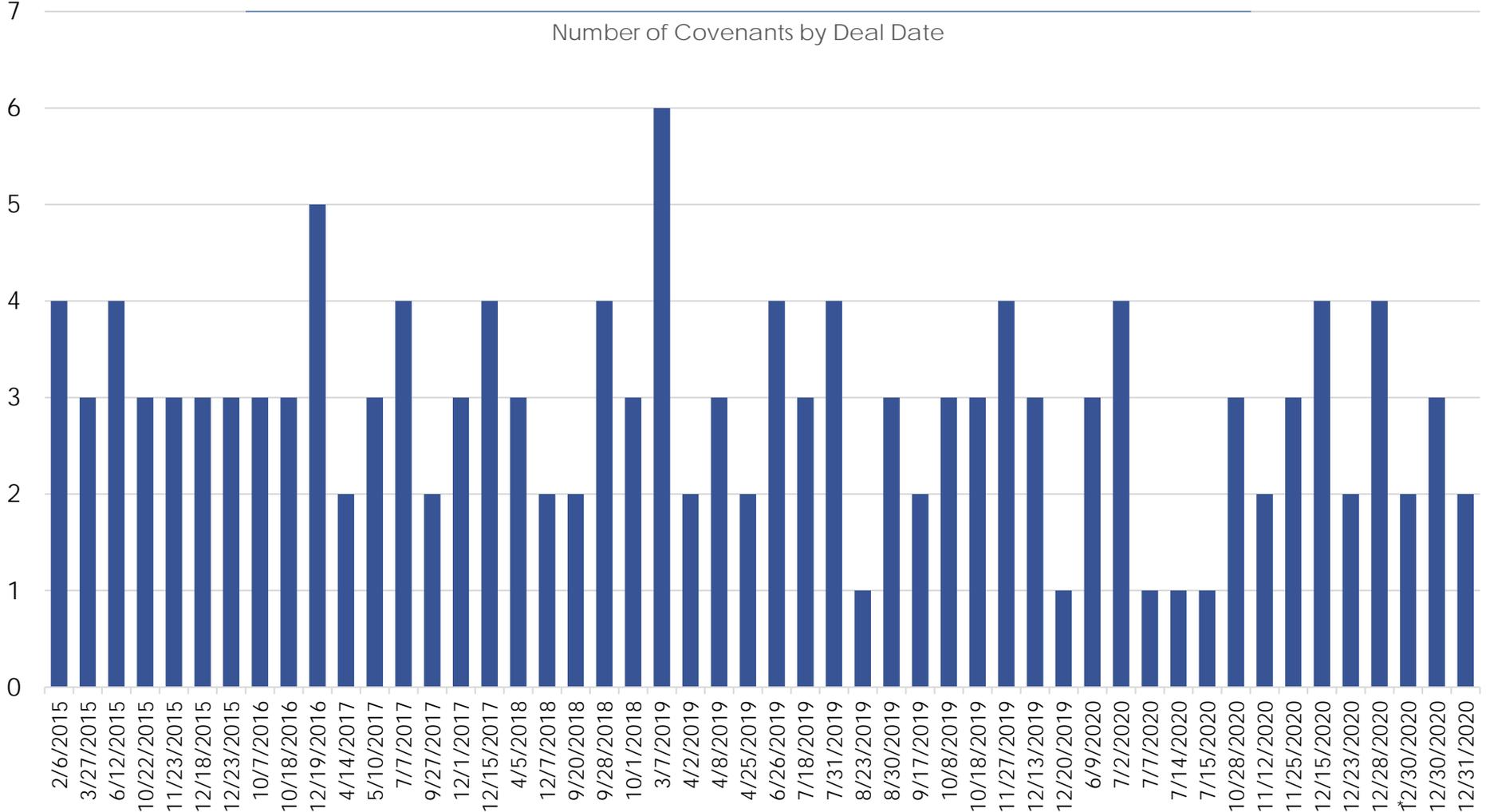
Gross-of-fee IRR performance figures represent deal level performance and do not include the deduction of fund level fees and expenses and do not represent the performance of any investor. An individual investor's returns will be reduced by advisory fees and other expenses incurred in the management of its account. ³ Estimated Portfolio-level gross IRR (i.e. deal performance) as of 12/31/2020 (at current est. Book Value). ⁴Current Weighted Avg. Yr3 ⁵Includes all active and realized deals to date.

Our Lower-Middle Market Loans Still have Covenants



- Middle market covenant-lite volume has spiked over the past few years
- Crestline’s lower-middle market loans continue to have covenants (~3 on average)

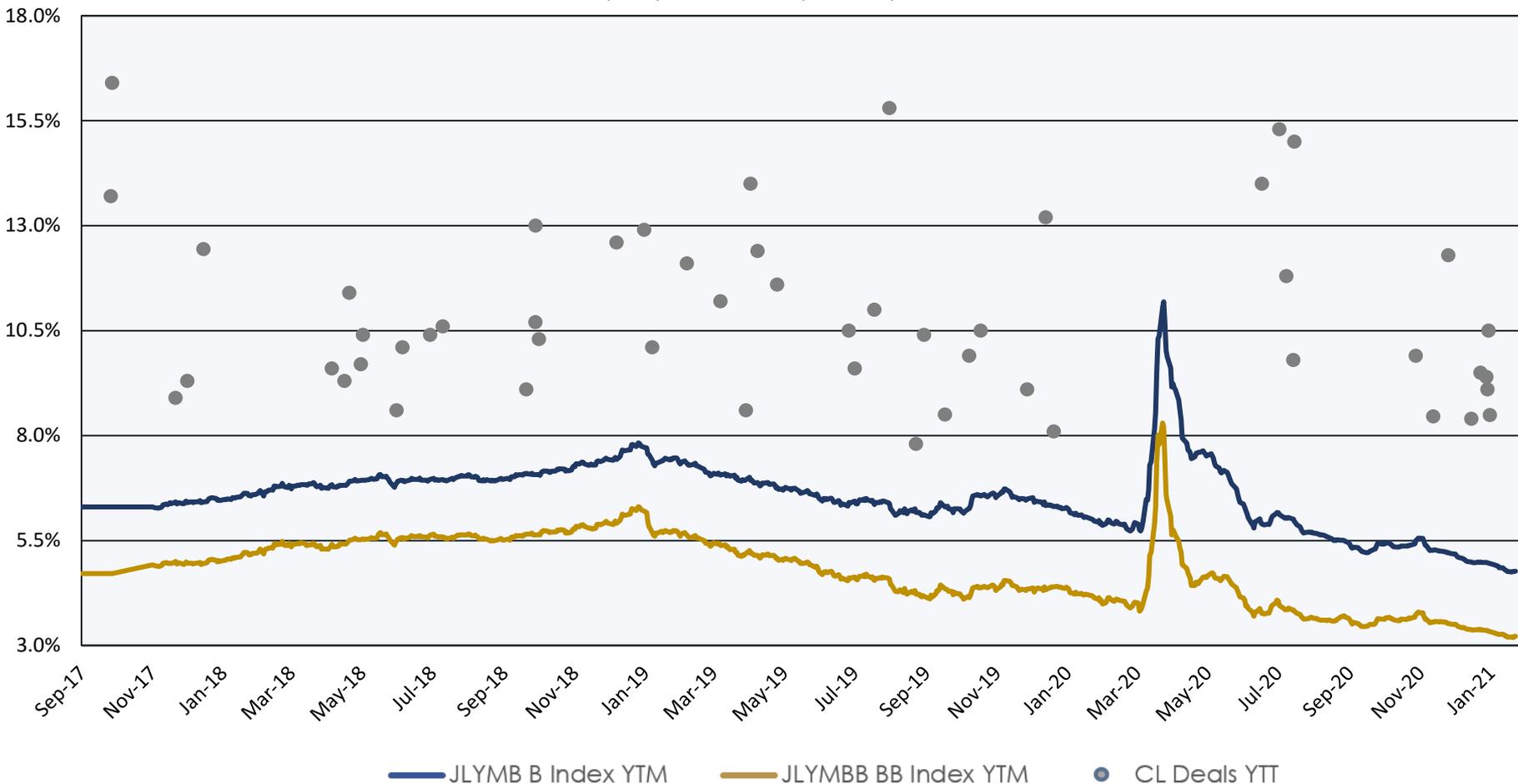
CRESTLINE LOWER-MIDDLE MARKET LOAN COVENANT STATISTICS



Crestline SLF II has generated a significant premium to the broadly syndicated loan market with similar risk.

- The average premium for SLF II deals vs. the JP Morgan single B Index¹ is 420bps
- Privately negotiated deals should benefit from better covenants and structures – further reducing risks in a downside

SLF II BASE CASE RETURNS (YTT) vs. JPM (B / BB) LEVERAGED LOAN INDICES YTM



As of 12/31/2020 unless otherwise noted. SLFI launched on 10/1/2014; SLFII launched on 8/1/2017; SLFIII launched on 7/1/2017

YTM = Yield to Maturity; YTT = Yield to Take Out (Three Year); ¹Crestline YTT less JLYMB B Index YTM at underwriting.

Crestline Specialty Lending Funds¹ have consistently maintained lower leverage, higher spreads/yields, and lower default and loss rates compared to the broader leveraged loan market.

	Leverage	Yield	Spread	Default Rate*	Loss Rate
Crestline ²	4.2x	9.9%	783 bps	0.60%	0.00%
Middle Market Leveraged Loans ³	4.8x	4.9%	405 bps	2.90%	n/a
Syndicated Leveraged Loans ³	5.2x	4.3%	364 bps	3.23%	n/a

Direct Alpha vs. Benchmark ⁴	
Specialty Lending Fund I	Specialty Lending Fund II
5.32%	6.36%

Benchmark: Bank of America Merrill Lynch High Yield Master II Total Return Index

As of 12/31/2020 unless otherwise noted.

¹SLFI launched on 10/1/2014; SLFII launched on 8/1/2017; SLFIII launched on 7/1/2017. ²Represents Crestline Specialty Lending Strategy and includes all assets in SLFI, SLFII & SLFIII. Yield = Yield to Three Year Takeout. ³Source: LCD, an offering of S&P Global Market Intelligence. Reflects most recent data available from LCD (all data as of Feb-21 aside from Middle Market leverage ratio, which is as of May-20). ⁴Please see performance notes and disclosures for a summary of Direct Alpha methodology. Benchmark used for analysis is BAML US HY MASTER II TR which is unlevered. Past performance is not indicative of future results.

*Default Rates: Crestline Default Rate reflects the cumulative strategy default rate from inception through 12/31/2020. Middle Market Default Rate reflects Proskauer's Private Credit Index of borrowers with \$25-\$49.9mm EBITDA and was calculated by dividing the number of defaulted loans by the aggregate number of loans in the index in Q4 2020. (per LCD Middle Market Weekly 2/11/2021). Syndicated Leveraged Loan Default Rate reflects the TIM default rate as of Feb-21 for all leveraged loans (per LCD Loan Stat Trendlines).

- Launched on October 1st, 2014
- As of December 31st, 2020, 42 transactions consummated
 - ~\$854 million funded on \$904.3 million of cumulative commitments¹
 - 34 realizations, all performed well above expectations, with a weighted average gross IRR⁶ of 13.4%
- Targeted returns of 10% to 13% (net of fees and including leverage)
- Target leverage is 0.5-1:1 debt/equity
- Annual Yield 2020: 10.16%
- SLFI Credit Summary
 - No payment defaults
- Net Fund IRR as of 9/30/2020: 12.15%*
- Direct Alpha as of 9/30/2020: 5.32%⁶

Fund Statistics (as of 12/31)	
Current Commitments Outstanding	\$102.1
Cumulative Committed	\$904.3
Cumulative Transactions	42
Active Transactions	8
Commitments in Lower Middle Market (current)	\$89.5
Commitments in Middle/Upper Middle Market (current)	\$12.6
% of Transactions in Lower MM	87.7%
% of Transactions in Middle/Upper MM	12.3%
% Floating Rate ²	100.0%
% First Lien / Unitranche	81.1%
% Call Protection (% active positions with call protection)	8.1%
EBITDA (at U/W) ⁵	\$12.8
Debt / EBITDA (at U/W) ^{3,4}	4.3x
LTV (at U/W)	55.7%
Upfront Fees / OID	1.8%
Weighted Avg. Spread	7.9%
Weighted Avg. Floor	0.9%
Yield to 3-Year Takeout	10.6%
Average Number of Covenants	3.1
% Portfolio with Covenants	100.0%

* The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses. Considering these factors, the lowest reported investor Net IRR in the US Feeder as of 9/30/2020 is 12.06%. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders.

Past performance is not indicative of future results.

¹ \$315mm Total Equity Commitment (\$300mm of asset based leverage capacity at peak (current asset based leverage is \$0); ² As a percentage of Fund Commitments; ³ Debt / EBITDA represents the debt through the security tranche Crestline holds. ⁴ ARR, RMR, and Asset-Backed deals are removed from the debt/EBITDA average ratios. ⁵ Portfolio statistic specific to EBITDA valuation-based companies (i.e. companies valued on an ARR, BCF, NOI, RMR, or other basis are excluded from the calculation dataset). ⁶ Please see performance notes and disclosures for a summary of Direct Alpha methodology. Benchmark used for analysis is BAML US HY MASTER II TR which is unlevered.

\$ in mm. Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Investor Commitments:

Fund:	\$314.2mm (Limited Partner Equity Commitment)	Investment Period Start Date:	11/1/2015
	\$300.0mm (Asset Based Leverage Facility) ¹	Investment Period End Date:	4/1/2018
Fund Total:	\$614.2mm		

As of:	4Q 2014	1Q 2015	2Q 2015	3Q 2015	4Q 2015	1Q 2016	2Q 2016	3Q 2016	4Q 2016	1Q 2017	2Q 2017	3Q 2017	4Q 2017
# of Investments	1	4	5	5	12	15	19	22	28	29	31	34	37
# of Full Realizations	-	-	-	-	-	-	1	1	4	5	7	10	11
Cumulative Income Distributed to Investors ²	-	-	-	-	-	-	-	\$3.2mm	\$7.5mm	\$11.8mm	\$17.0mm	\$24.4mm	\$30.9mm
Quarterly Distribution Yield ³	-	-	-	-	-	-	-	2.43%	2.52%	2.50%	2.96%	3.71%	3.23%
Annual Yield ³	-	-	-	-	-	-	-	-	6.14%	-	-	-	12.49%
Net IRR*	n/m	n/m	n/m	n/m	-5.71%	2.79%	7.83%	7.58%	8.87%	10.44%	11.04%	11.75%	12.13%
ITD LP P&L ⁴	-\$0.6mm	-\$0.4mm	-\$1.0mm	-\$1.6mm	-\$1.6mm	\$1.4mm	\$5.8mm	\$8.1mm	\$13.2mm	\$20.1mm	\$26.0mm	\$33.6mm	\$40.8mm
MOIC:													
Realized	0.00x	0.02x	0.04x	0.07x	0.09x	0.12x	0.14x						
Unrealized	0.95x	0.99x	0.95x	0.91x	0.96x	1.01x	1.05x	1.03x	1.03x	1.05x	1.05x	1.05x	1.04x
Total	0.95x	0.99x	0.95x	0.91x	0.96x	1.01x	1.05x	1.05x	1.07x	1.12x	1.14x	1.17x	1.18x
As of:	1Q 2018	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019	4Q 2019	1Q 2020	2Q 2020	3Q 2020		
# of Investments	37	41	41	42	42	42	42	42	42	42	42		
# of Full Realizations	16	20	21	21	25	25	26	27	28	29	30		
Cumulative Income Distributed to Investors ²	\$37.0mm	\$44.2mm	\$49.8mm	\$56.3mm	\$61.5mm	\$70.0mm	\$75.0mm	\$81.8mm	\$87.2mm	\$90.8mm	\$95.1mm		
Quarterly Distribution Yield ³	2.75%	3.22%	2.42%	3.09%	2.71%	4.53%	2.72%	3.71%	3.00%	2.04%	2.45%		
Annual Yield ³	-	-	-	11.44%	-	-	-	13.66%	-	-	-		
Net IRR*	12.31%	12.14%	12.00%	11.00%	12.57%	12.56%	12.67%	12.62%	10.49%	12.03%	12.15%		
ITD LP P&L ⁴	\$48.1mm	\$54.0mm	\$60.2mm	\$60.3mm	\$76.0mm	\$81.8mm	\$88.5mm	\$94.0mm	\$79.8mm	\$99.2mm	\$105.9mm		
MOIC:													
Realized	0.17x	0.19x	0.24x	0.42x	0.45x	0.52x	0.54x	0.58x	0.62x	0.64x	0.66x		
Unrealized	1.05x	1.04x	1.02x	0.83x	0.87x	0.83x	0.83x	0.82x	0.72x	0.78x	0.78x		
Total	1.22x	1.23x	1.26x	1.25x	1.32x	1.35x	1.37x	1.40x	1.34x	1.42x	1.44x		

* The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses. Considering these factors, the lowest reported investor Net IRR in the US Feeder as of 9/30/2020 is 12.06%. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders.

Shading represents investment period.

IRR is not meaningful for periods of less than one year. Past performance is not indicative of future results.

¹Current Asset Based Leverage Facility size is \$0mm (as of 9/30/2020). ²Income includes interest received and misc. income received. ³Yields are calculated as cumulative income distributed to LPs during the observation period over the average LP equity outstanding during the same observation period. ⁴Calculated as total value created for Limited Partners (NAV plus cumulative distributions) less capital called from Limited Partners.

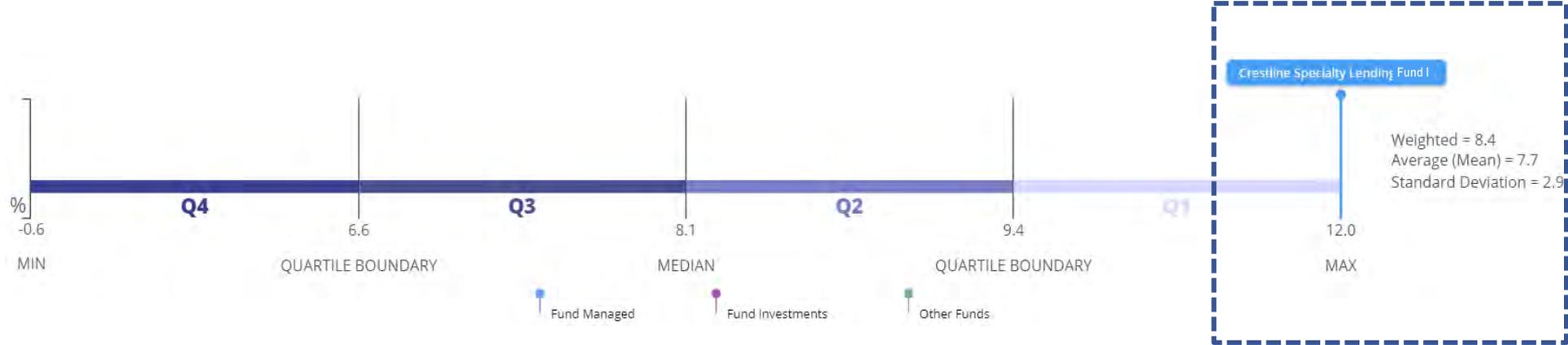
#1 Performing Direct Lending Fund (2014 Vintage)



Preqin has identified Crestline as the top performing manager across all 2014 vintage North American Direct Lending funds

Preqin Fund Performance

Strategy	Geography	Vintage
Direct Lending	North America	2014



Source: Preqin (as of Jan. 2021). Resulting from the following screen in Preqin database: Private Capital Benchmarks> North American Direct Lending> 2014 Vintage. Preqin is a leading provider of data, analytics and insights to the alternative assets community. Past performance is not indicative of future results. See disclosures for additional information.

- Launched on August 1st, 2017
- As of December 31st, 2020, 49 total transactions consummated
 - ~\$1,272 million funded on \$1,463 million of cumulative commitments¹
- Targeted returns of 10% to 13% (net of fees and including leverage)
 - Targets underdeveloped competitive landscape for opportunities between \$20-100 million
 - Industries with recurring revenues, multi-site businesses for risk mitigation and/or asset-backed
- Target leverage is 0.5-1:1 debt/equity
- Annual Yield 2020: 9.77%
- Net Fund IRR as of 9/30/2020: 12.08%*
- Direct Alpha as of 9/30/2020: 6.36%⁶

Fund Statistics (as of 12/31)	
Current Commitments Outstanding	\$1,020.8
Cumulative Committed	\$1,462.7
Cumulative Transactions	49
Active Transactions	36
Commitments in Lower Middle Market (current)	\$519.7
Commitments in Middle/Upper Middle Market (current)	\$501.1
% of Transactions in Lower MM	50.9%
% of Transactions in Middle/Upper MM	49.1%
% Floating Rate ²	96.2%
% First Lien / Unitranche	94.4%
% Call Protection (% active positions with call protection)	79.6%
EBITDA (at U/W) ⁵	\$28.4
Debt / EBITDA (at U/W) ^{3, 4}	4.2x
LTV (at U/W)	45.7%
Upfront Fees / OID	1.6%
Weighted Avg. Spread	7.9%
Weighted Avg. Floor	1.1%
Yield to 3-Year Takeout	10.0%
Average Number of Covenants	2.7
% Portfolio with Covenants	100.0%

* The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses. Considering these factors, the lowest reported investor Net IRR in the US Feeder as of 9/30/2020 is 11.66%. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders.

Fund equity-level performance (inclusive of the effects of fund-level leverage) is calculated using the current market value estimate of each position including accreted OID/upfront fees and interest received at month end.

Past performance is not indicative of future results.

¹ \$1,206mm Total Equity Commitment (includes \$500mm of asset based leverage commitment) ² As a percentage of Fund Commitments ³ Debt / EBITDA represents the debt through the security tranche Crestline holds ⁴ ARR, RMR, and Asset-Backed deals are removed from the debt/EBITDA average ratios ⁵ Portfolio statistic specific to EBITDA valuation-based companies (i.e. companies valued on an ARR, BCF, NOI, RMR, or other basis are excluded from the calculation dataset)⁶ Please see performance notes and disclosures for a summary of Direct Alpha methodology. Benchmark used for analysis is BAML US HY MASTER II TR which is unlevered.

\$ in mm. Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Investor Commitments:

Fund:	\$705.4mm (Limited Partner Equity Commitment)	Investment Period Start Date:	8/1/2017
	\$500.0mm (Asset Based Leverage Facility) ¹	Investment Period End Date:	7/31/2021
Fund Total:	\$1205.4mm		

As of:	4Q 2017	1Q 2018	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019	4Q 2019	1Q 2020	2Q 2020	3Q 2020
# of Investments	5	5	13	17	20	24	26	32	39	39	40	43
# of Full Realizations	-	-	1	1	1	2	2	2	4	6	7	8
Cumulative Income Distributed to Investors ²	-	-	-	-	-	\$10.4mm	\$17.3mm	\$24.1mm	\$37.7mm	\$46.9mm	\$46.9mm	\$67.0mm
Quarterly Distribution Yield ³	-	-	-	-	-	3.91%	2.38%	2.23%	3.95%	2.56%	-	4.58%
Annual Yield ³	-	-	-	-	-	-	-	-	12.50%	-	-	-
Net IRR*	n/m	n/m	n/m	n/m	5.65%	12.42%	12.00%	13.40%	13.66%	0.20%	11.14%	12.08%
ITD P&L ⁴	-\$1.3mm	-\$0.4mm	\$1.4mm	\$4.7mm	\$4.9mm	\$18.4mm	\$26.3mm	\$39.4mm	\$51.7mm	\$0.9mm	\$62.2mm	\$80.7mm
MOIC:												
Realized	0.00x	0.00x	0.00x	0.00x	0.00x	0.03x	0.34x	0.32x	0.35x	0.34x	0.31x	0.34x
Unrealized	0.94x	0.98x	1.02x	1.03x	1.02x	1.02x	0.72x	0.76x	0.76x	0.66x	0.80x	0.80x
Total	0.94x	0.98x	1.02x	1.03x	1.02x	1.05x	1.06x	1.08x	1.11x	1.00x	1.11x	1.14x

* The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses. Considering these factors, the lowest reported investor Net IRR in the US Feeder as of 9/30/2020 is 11.66%. Net IRRs do not include any closing interest earned or paid to early closers. Please see performance notes for lowest reported investor Net IRR in all feeders.

Shading represents investment period.

n/m – not meaningful; We believe the IRR calculation in the early stages is not meaningful because the IRR is not reflective of the IRR that will ultimately be achieved and would not be helpful to readers. Past performance is not indicative of future results.

¹Current Asset Based Leverage Commitment is \$500mm as of 9/30/2020.

²Includes interest and misc. income.

³Yields are calculated as cumulative income distributed to LPs during the observation period over the average LP equity outstanding during the same observation period.

⁴Calculated as total value created for Limited Partners (NAV plus cumulative distributions) less capital called from Limited Partners

Specialty Lending Fund III

Fundraising

- Specialty Lending Fund III initial close occurred Jul 2020
- Strategy fundraise totaling \$370.5mm through Feb 2021
 - includes commingled of \$270.5mm
- Next close targeted for Apr 2021
- Plans to launch an unlevered direct lending fund mid-2021
- Total target fund equity of \$2-\$2.5bn
 - total strategy raise, levered and unlevered

North American Focus

Established jurisdictions for creditor rights

Target Enterprise Value: \$30 – \$200mm+

Large, underserved and attractive opportunity set in the middle and lower-middle market

Over 90% 1st Lien < 10% 2nd Lien/Minority Equity

Emphasis on capital preservation through first dollar of risk attachment points

Crestline’s investment strategy is to focus on providing senior secured debt to defensible companies with strong and sustainable fundamentals and the following business attributes:

- Market leaders with high barriers to entry
- Defensible niche product or service
- Recurring revenue businesses with min. attrition
- Highly diverse customer bases
- Substantial asset value or EV relative to loan size
- Low technology and market risk
- Experienced and incentivized management team
- Low to moderate capex requirements

Differentiated Sourcing Network

- Industry specializations
- Private equity sponsors
- Cross platform synergies
- Restructuring advisors
- Board seats
- Cap market/trading desks
- Illiquid and liquid debt

Structuring, Protections & Control

- Floating rates mitigate risk of rising interest rates
- 100% maintenance covenants
- 100% call protection
- Conservative LTVs
- Significant negative controls

Capital Preservation

- We underwrite to a full return of principle
- We take senior most position in the capital structure
- We structure to ensure repayment of capital
- We covenant to ensure control

Why Crestline – Industry Specializations



Industry specialists provide deeper sourcing channels and expertise in underwriting.

CRESTLINE INDUSTRY EXPERT

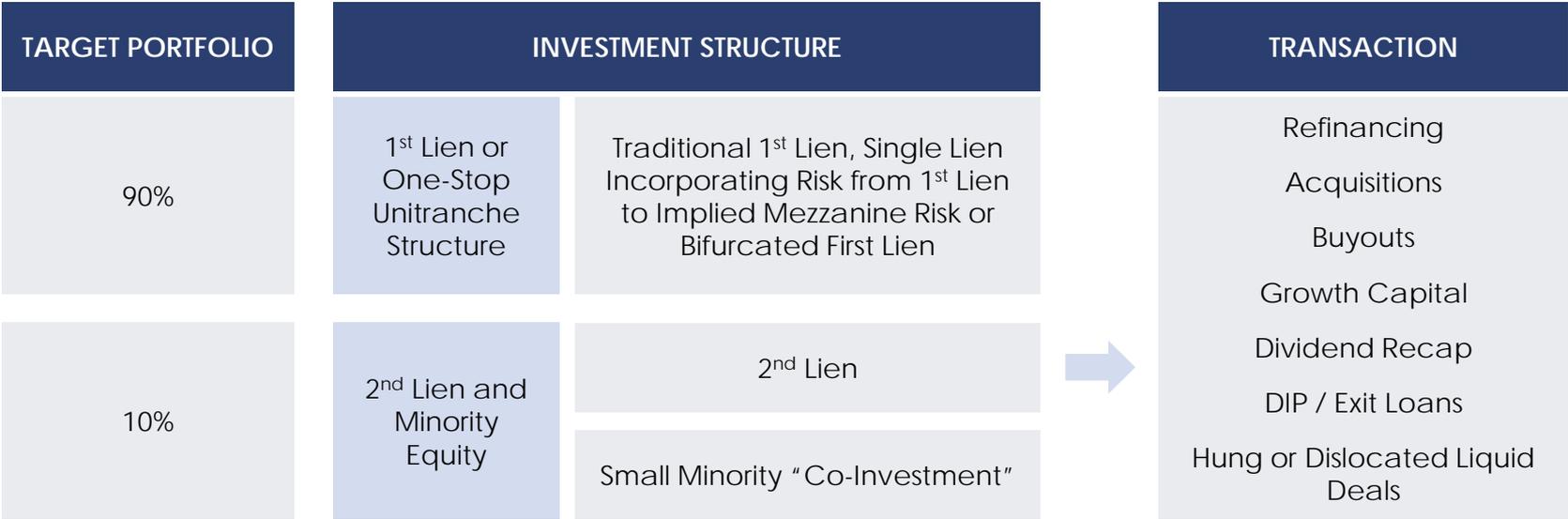
RECURRING REVENUE

MULTI-SITE / DISCRETE POOLS OF VALUE

ASSET BACKED

RESTRUCTURING

CRESTLINE INDUSTRY EXPERT	RECURRING REVENUE	MULTI-SITE / DISCRETE POOLS OF VALUE	ASSET BACKED	RESTRUCTURING
	Security Alarms	Business Services	Traditional ABL	Restructuring/ Distressed
Keith Williams		Education	Specialty Finance	
Chris Semple	✓	Healthcare Services	Real Estate	✓
Michael Aingorn		Spec. Retail / Franchisor		✓
Steven List		Waste Management	Industrials	✓
Will Palmer	✓	Media		✓
Rahul Vaid	✓	Retail		✓
James Delaune				✓
Alfonso Ramirez	✓			✓
Clark Wen				✓
Jake Friemel				✓



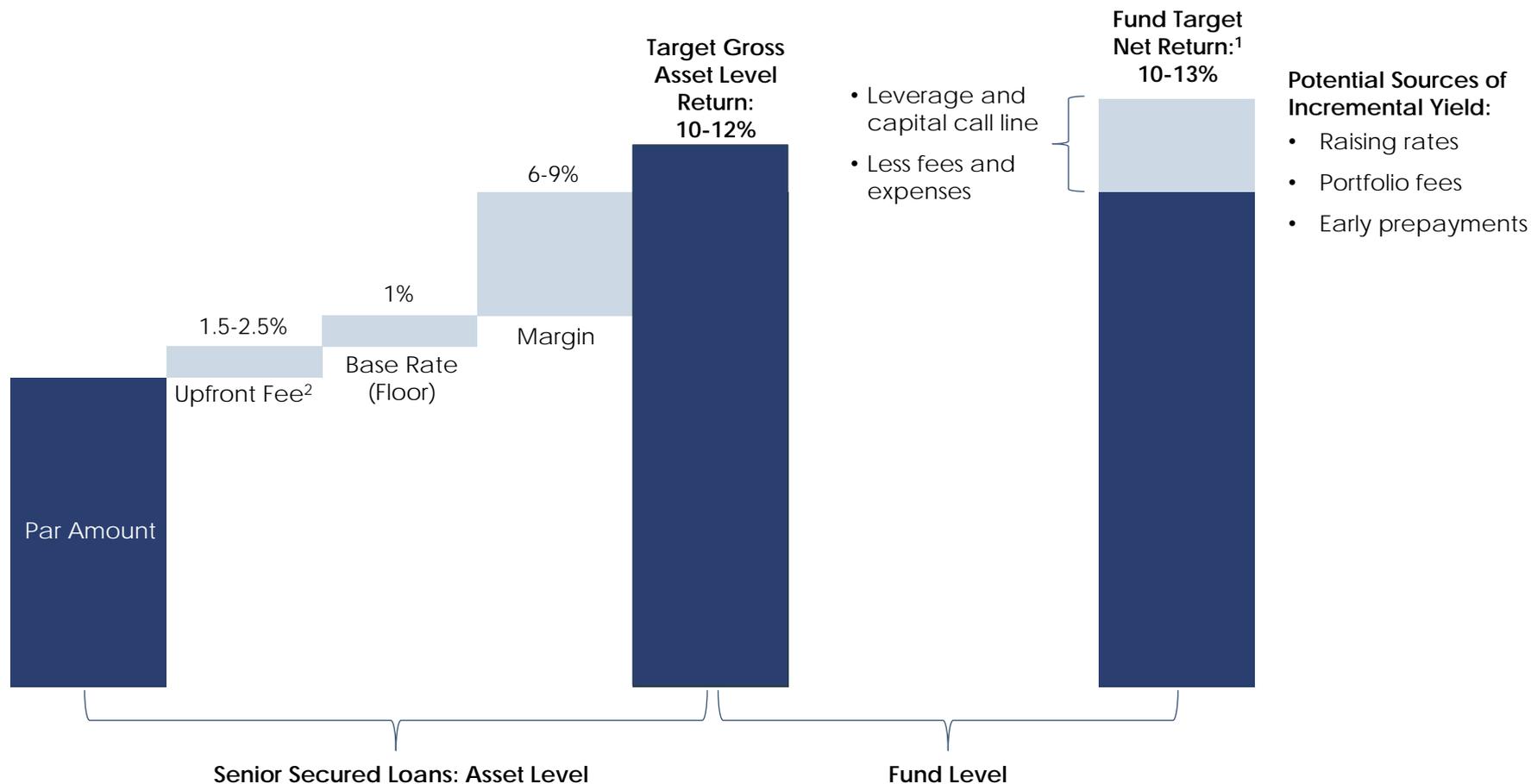
TYPICAL LOAN METRICS

TARGET SIZE: \$20 – 100 million	OID: Up to 5%
COUPON RANGE: LIBOR + 5.5% – 10%	MISCELLANEOUS FEES: Up to 2%
LIBOR FLOORS: Up to 2%	EQUITY "CO-INVESTMENT": 0 – 5%

Actual portfolio composition may differ from target portfolio due to various factors.

The Fund will seek attractive risk-adjusted returns (10-13% net) while investing in private 1st lien senior secured loans.¹

NORTH AMERICAN AVERAGE TARGET RETURN BREAKDOWN



For illustrative purposes only.

1. Target yields assume 60% advance rate and are based on last twelve months' investment experience and Crestline's market observations.

2. Yield includes one third of upfront fee given assumed three-year average life of senior loans.

Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. This material reflects hypothetical, back-tested performance results which are inherently imprecise and as such used for illustrative purposes only. See disclosures for important information.

Crestline’s stringent structuring and tight loan documentation enable us to better control our destiny and lead to better outcomes



Blocking Rights



Maintenance Covenants



Negative Controls



Board Participation



Protective Provisions



Work with Trusted Partners



- Launched on July 1st, 2020
- As of December 31st, 2020, 11 total transactions consummated
 - ~\$87 million funded on \$151 million of cumulative commitments¹
- Targeted returns of 10% to 13% (net of fees and including leverage)
 - Targets underdeveloped competitive landscape for opportunities between \$20-100 million
 - Industries with recurring revenues, multi-site businesses for risk mitigation and/or asset-backed
- Target leverage is 0.5-1:1 debt/equity
- Target annual yield: 10%+

Fund Statistics (as of 12/31)	
Current Commitments Outstanding	\$111.8
Cumulative Committed	\$151.0
Cumulative Transactions	11
Active Transactions	10
Commitments in Lower Middle Market (current)	\$74.4
Commitments in Middle/Upper Middle Market (current)	\$37.5
% of Transactions in Lower MM	66.5%
% of Transactions in Middle/Upper MM	33.5%
% Floating Rate ²	100.0%
% First Lien / Unitranche	100.0%
% Call Protection (% active positions with call protection) ²	89.4%
EBITDA (at U/W) ⁵	\$18.0
Debt / EBITDA (at U/W) ^{3, 4}	4.4x
LTV (at U/W)	41.2%
Upfront Fees / OID	1.4%
Weighted Avg. Spread	7.2%
Weighted Avg. Floor	1.2%
Yield to 3-Year Takeout	9.3%
Average Number of Covenants	2.5
% Portfolio with Covenants	100.0%

Past performance is not indicative of future results.

¹ \$177.5mm Total Equity Commitments through 12/31/2020 (asset-based leverage facility negotiations in process) ² As a percentage of Fund Commitments ³ Debt / EBITDA represents the debt through the security tranche Crestline holds ⁴ ARR, RMR, and Asset-Backed deals are removed from the debt/EBITDA average ratios ⁵ Portfolio statistic specific to EBITDA valuation-based companies (i.e. companies valued on an ARR, BCF, NOI, RMR, or other basis are excluded from the calculation dataset)

\$ in mm. Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance.

Current Portfolio Snapshot



Current Portfolio Loan Details as of 12/31/2020

Project	Sector	Security	Commitment	Interest Rate	Origination OID	Yield to 3-Yr Takeout (YT3)	Reported EBITDA / Other Basis	Call Protection	Covenants
Project Amazon*	Financials	First Lien	\$5.5	LIBOR + 1,156bps	0.0%	13.7%	\$0.0	105, 103, 101	TLR, Max Charge Off Ratio
Project Alpharetta	Financials	First Lien	\$1.0	LIBOR + 850bps	2.3%	10.7%	\$60.1	101 if refi	Max Net Leverage
Project Protein	Health Care	First Lien	\$8.6	LIBOR + 625bps	2.0%	8.1%	\$28.5	102, 101	Senior Net Leverage, FCCR
Project Aquafresh*	Health Care	First Lien	\$20.9	LIBOR + 1,000bps	2.0%	12.5%	\$9.7	NC-18 months, 103 (mo 19-24), 102 (mo 25-36)	TLR, FCCR, Liq.
Project Commonwealth 2.0*	Communications	First Lien	\$11.2	LIBOR + 650bps	2.0%	8.4%	\$0.0	105, 102	Max EBITDA Leverage, Max BCF Leverage, Min FCCR, Min Liquidity
Project Frazier*	Health Care	First Lien	\$20.8	LIBOR + 700bps	1.0%	8.5%	\$13.9	104, 103, 102	Max Net Leverage, FCCR
Project Ute	Consumer Discretionary	First Lien	\$10.3	LIBOR + 650bps	1.8%	8.3%	\$4.5	103 (18 Mos), , 102 (next 6 Mos), 101 (next 12 Mos)	Max Attrition, Max TLR, Max Creation Cost, Min Liq.
Project Chompers	Health Care	First Lien	\$17.8	LIBOR + 650bps	1.7%	8.3%	\$32.9	103, 102, 101	TLR, FCCR
Project Ewing*	Technology	First Lien	\$30.0	LIBOR + 700bps	1.3%	9.1%	\$42.1	102, 101	Min LQA, Min Liq., Recurring Revenue
Project Grease*	Industrials	First Lien	\$5.8	LIBOR + 650bps	1.5%	8.2%	\$15.3	102, 101	TLR, FCCR

Realizations as of 12/31/2020

Payoff/Sell Date	Commitment Date	Project Name	Type of Exit	U/W LTV	U/W YTT	LTV at Exit	Realized IRR	Realized MOIC
12/14/2020	9/10/2020	Project Wink	Acquired	56%	13.2%	39%	48.9%	1.11x

* Denotes Lower Middle Market Transaction; \$ in mm

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or predication of any particular performance. Past performance is not a guaranty of future results.

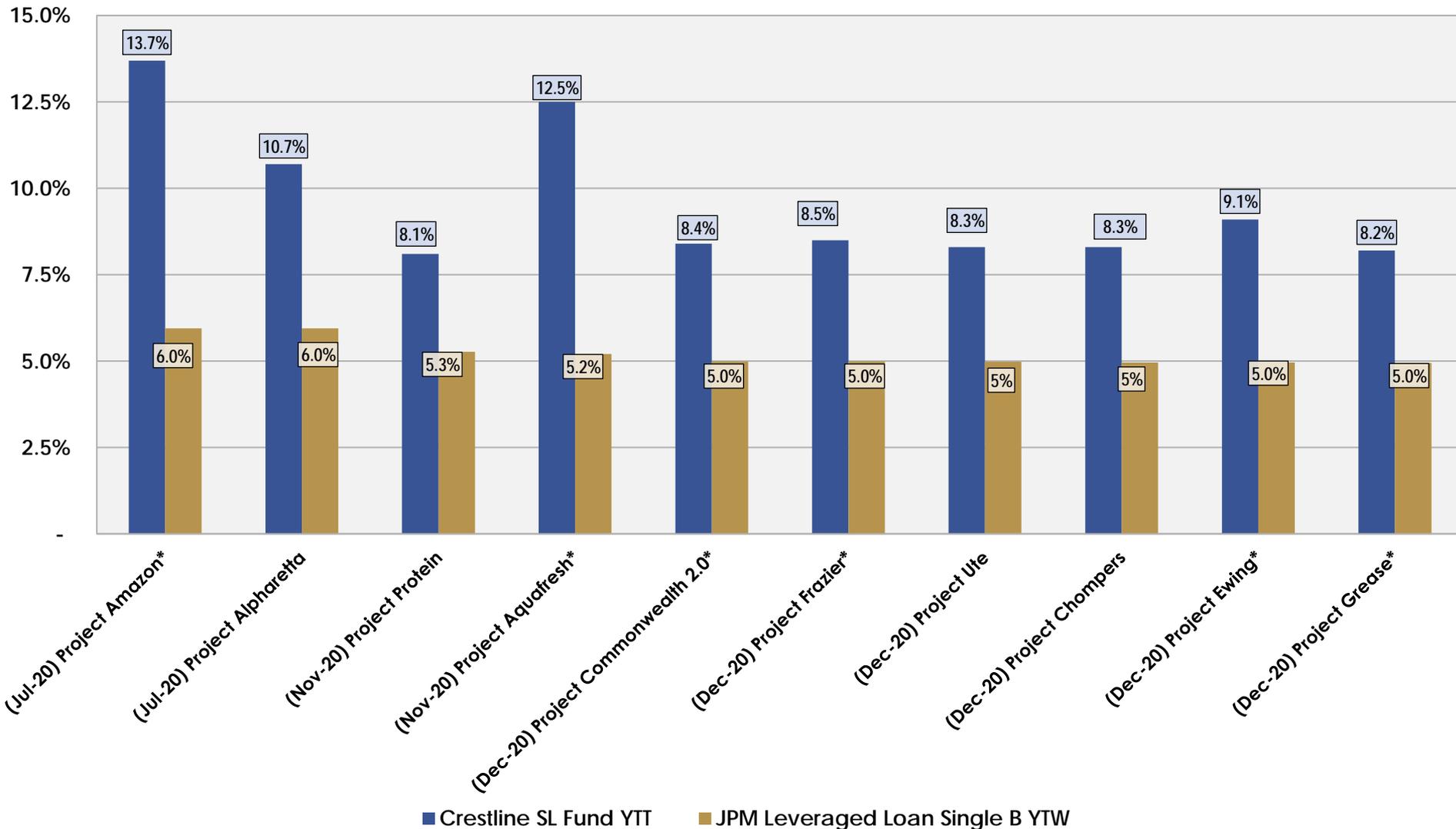
Gross-of-fee IRR performance figures represent deal level performance and do not include the deduction of fund level fees and expenses and do not represent the performance of any investor. An individual investor's returns will be reduced by advisory fees and other expenses incurred in the management of its account.

FCCR—Minimum Fixed Charge Coverage Ratio; Liq—Minimum Liquidity; Min. Rec Rev—Minimum Recurring Revenue; Min EBITDA—Minimum EBITDA; TLR—Maximum Total Leverage Ratio; SLR—Maximum Senior Leverage Ratio; Capex—Maximum Capex; Max Cash Burn—Maximum Cash Burn; Attrition—Maximum Annualized Attrition Rate; PDP PV-10%/Debt—Minimum Proved Developed Producing, Present Value to Debt Ratio. OID—Original Issue Discount (up-front fees)

Specialty Lending Portfolio Loans Premium to Comparable Market



Crestline Specialty Lending Fund III YTT (at U/W) vs. JPM Leveraged Loan Single B YTW (7/1/2020 inception through 12/31/2020)



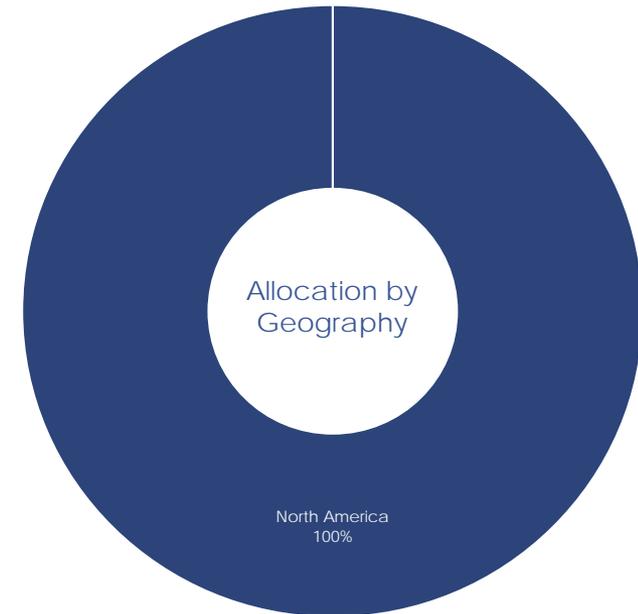
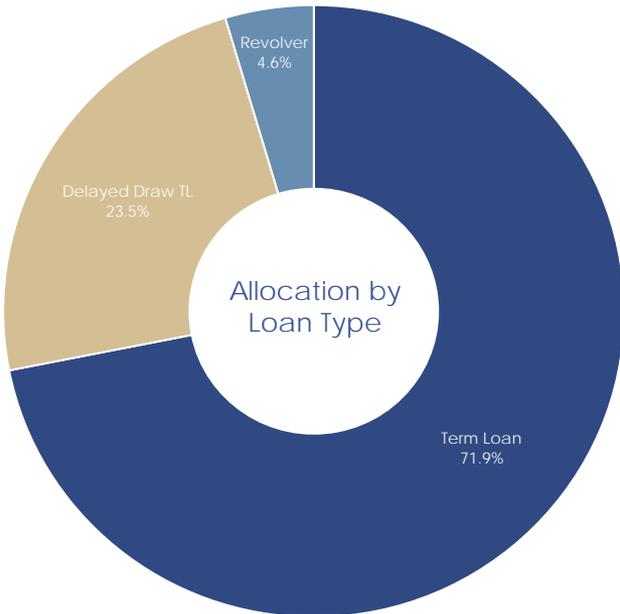
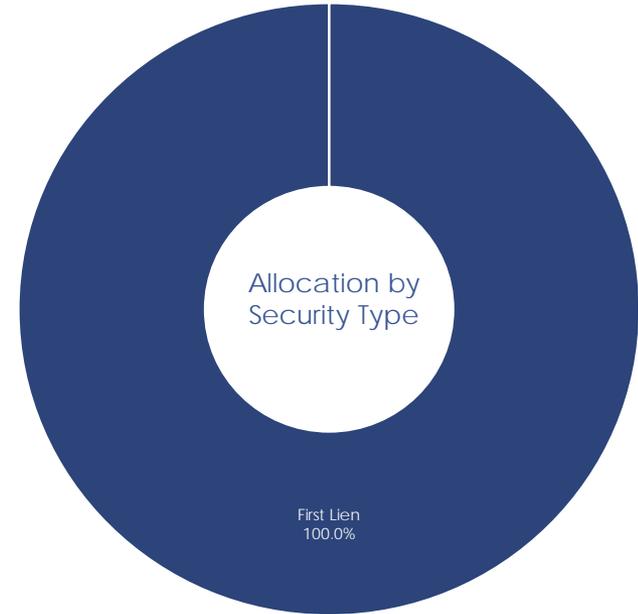
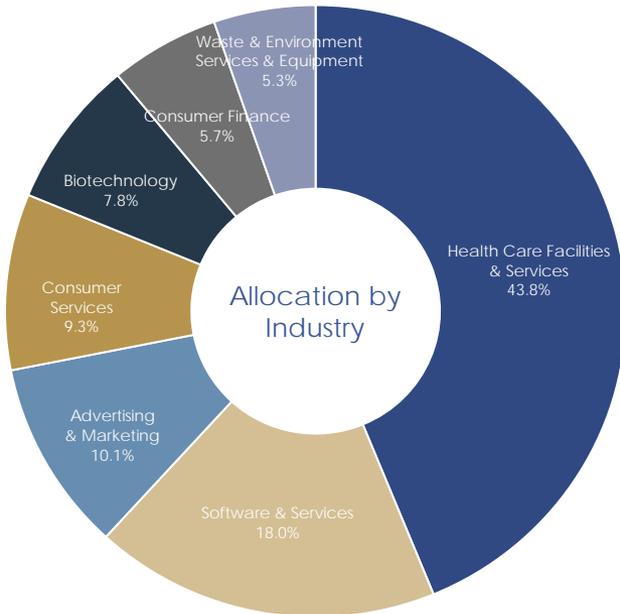
YTT = Yield to 3-year takeout; YTW = Yield to Worst; U/W = Underwriting

* Denotes Lower Middle Market Transaction

Expected/Target returns are forward-looking statements that are subject to uncertainties and should not be regarded as a representation, warranty, or prediction of any particular performance. Actual performance may vary.

Current Portfolio Allocations

As of 12/31/2020



Crestline Specialty Lending Investment Pipeline



As of January 2021

Project Name	Attribute	Sector	Stage	Size (\$mm)	LTV	Target Return IRR / MOIC
Project Mojito	Recurring Revenue	Financial Services	Approved	\$100	0-30%	14% / 1.4x
Project Excavator 2.0	Recurring Revenue	Software	Approved	\$130	0-50%	10% / 1.5x
Project Cayman	Recurring Revenue	Software	Due Diligence	\$35	0-52%	8% / 1.3x
Project Fix It	Re-occurring Revenue	Industrial Services	Due Diligence	\$30	0-45%	9% / 1.3x
Project Connect 3.0	Recurring Revenue, Multiple Pools	Health Care	Due Diligence	\$430	0-65%	10% / 1.3x
Project Sitter	Recurring Revenue	Health Care	Early Stages	\$79	0-50%	9% / 1.3x
Project 42	Multi-Site / Multiple Pools	Industrial Services	Early Stages	\$30	0-50%	9% / 1.3x
Project Findings	Recurring Revenue	Software	Early Stages	\$50	0-75%	20% / 2.2x
8 Primary Deals				\$884	0-52%	11% / 1.5x

Expected/Targeted returns are forward-looking statements that are subject to uncertainty as described further in the relevant offering memorandum and should not be regarded as a representation, warranty or prediction of any particular performance. Actual performance may vary.

Gross-of-fee IRR performance figures represent deal level performance and do not include the deduction of fund level fees and expenses and do not represent the performance of any investor. An individual investor's returns will be reduced by advisory fees and other expenses incurred in the management of its account.

Appendix

Organizational Chart – Opportunistic and Direct Lending

Investment Committee

DOUG BRATTON
 Founding Partner & CIO
Opportunistic and Direct Lending

JOHN COCHRAN
 Partner & COO
Opportunistic and Direct Lending

KEITH WILLIAMS
 Managing Partner,
 Credit Strategies
Opportunistic and Direct Lending

CHRIS SEMPLE
 Partner, US Credit
Opportunistic and Direct Lending

MICHAEL GUY
 CIO Europe
Opportunistic and Direct Lending

WILL PALMER
 Managing Director
Direct Lending

Senior Investment Team

KEITH WILLIAMS
 Managing Partner, Credit Strategies

CHRIS SEMPLE
 Partner, US Credit

MICHAEL AINGORN
 Managing Director

JAMES DELAUNE
 Managing Director

STEVEN LIST
 Managing Director

WILL PALMER
 Managing Director

ALFONSO RAMIREZ
 Managing Director

MARC STRAUSS
 Managing Director

RAHUL VAID
 Managing Director

MICHAEL BULLARD
 Director

AARON MACK
 Director

CLARK WEN
 Director

 **MICHAEL GUY**
 CIO, Europe

 **JONATHAN NORTON**
 Managing Director, Europe

 **ANDREY PANNA**
 Managing Director, Europe

 **SANJEEV SARKAR**
 Managing Director, Europe

 **CHRIS MARCHAK**
 Director, Europe

 **JONATHAN REDMAN**
 Director, Europe

Investment Team

TAYLOR BROWN
 Vice President

JAKE FRIEMEL
 Vice President

GRAHAM GRUNOW
 Vice President

MATTHEW HUDSON
 Vice President

CHRIS WEBER
 Vice President

GABRIEL SCHUCH
 Senior Associate

RICKY SIMON
 Senior Associate

CHRIS WHITE
 Senior Associate

BRADLEY NEUNUEBEL
 Associate

 **EEKEEN WONG**
 Associate

JOSH WITCZAK
 Senior Analyst

ANDREA ADLER
 Analyst

 **AUSTIN ALLISON**
 Analyst

JANE LYNCH
 Analyst

DANIEL SHAHEEN
 Analyst

Operations and Middle Office

JEREMIAH LOEFFLER
 COO, Credit & Opportunistic Strategies

 **JOE PIGOTT**
 Managing Director, COO Europe

TRAVIS KEITH
 Director

Five Middle Office Professionals

Additional Investment Team Support

Loan Servicing & Monitoring

Agent & Loan Services

Middle Office

Accounting & Treasury

Respected Fund Administrator

Legal & Compliance

Client Partnership Group

 *A transatlantic senior team collaboratively working together to find the best risk-adjusted returns* 

Fort Worth		New York	
<p>Frank Jordan <i>Partner, Head of Client Partnership Group</i> Crestline Investors, Inc. 817-339-7397 fjordan@crestlineinc.com</p>		<p>Graham Officer <i>Managing Director, Head of Summit Marketing</i> Crestline Investors, Inc. 212-220-8808 gofficer@crestlineinc.com</p>	<p>Chris Golio <i>Managing Director</i> Crestline Investors, Inc. 212-220-8806 cgolio@crestlineinc.com</p>
Tokyo	London	Los Angeles	Toronto
<p>Makoto Meguro Crestline Asia, Inc. +81-3-5789-5717 mmeguro@crestlineinc.com</p>	<p>Joe Pigott <i>Chief Operating Officer</i> Crestline Europe +44 (0)207-747-2163 jpigott@crestlineinc.com</p>	<p>Sean Gannon <i>Managing Director</i> 310-801-3433 sgannon@crestlineinc.com</p>	<p>Paul Robson <i>Head of Client Partnership Group Canada and President</i> Crestline Canada, Inc. 416-644-8751 probson@crestlineinc.com</p>

General Risks of Investing in the Crestline Funds

An investment in the Funds is speculative and involves a high degree of risk. The Funds are generally not subject to regulatory restrictions or oversight. Crestline Management, L.P., is a federally registered investment adviser and provides investment advice through various affiliates and subsidiaries. Crestline Canada, Inc. and its subsidiary Crestline Canada Sub, L.P. are investment managers doing business in Canada that provide the “beta” overlay advice to Crestline Management, L.P. and certain Canadian trusts. Crestline Europe, LLP, registered with the Financial Conduct Authority (“FCA”), serves as the European investment adviser and is helping Crestline with investment diligence and analysis for its clients on certain primarily European opportunities. The Funds may employ leverage, which among other investment techniques, can make their investment performance volatile. Opportunities for redemptions and transferability of interests in the Funds are restricted so investors may not have access to their capital if and when it is needed. There is generally no secondary market for an investor’s interest in the Funds and none is expected to develop. The Funds’ management fees, incentive fees/allocations, and expenses, may offset their trading profits. An investor should not invest in the Funds unless it is prepared to lose all or a substantial portion of its investment.

Principal executive officers of Crestline are also associated with Bratton Capital Management, LP (“BCM”) a firm that acts as the investment adviser and general partner to single family-office-related investments. Crestline and BCM are under common control.

This report may not be reproduced, distributed or transmitted in whole or in part in any media.

This document is a summary, is for informational purposes only and does not constitute an offer to sell or a solicitation of any offer to buy or sell securities of any entity, investment product or investment advisory service. Any offer will be made only pursuant to a confidential offering memorandum. There can be no guarantee that the Funds will achieve their investment objective. An investment in the Funds is speculative and involves a high degree of risk, and investors risk loss of their entire investment. Past performance is not indicative of future performance.

Some information contained in this document is based on data received from third parties that we consider reliable and is accurate to the best of Crestline’s knowledge. However, Crestline has not independently verified the information and does not otherwise give any warranty as to the truth, accuracy, or completeness of such third party data, and it should not be relied upon as such. The material is not intended to be a formal research report and nothing in this presentation should be interpreted to state or imply that past results are an indication of future performance.

Any opinions expressed herein are our current opinions only. There can be no assurance or guarantee that Crestline's investment strategy will achieve its stated goal. All information provided in this presentation is for informational purposes only. In addition, it should not be assumed that any of the securities and/or strategies discussed herein were or will prove to be profitable. Crestline accepts no liability for loss arising from the use of this material.

Within a particular strategy, Crestline may offer a domestic fund and an offshore fund (“Funds”) that are managed *pari passu*. In such cases the Funds managed by Crestline will have investment objectives that are identical or substantially similar. It is not anticipated, however, that the Funds managed by Crestline having identical or substantially similar investment objectives will have identical or substantially similar investment portfolios. Differing investment portfolios can be expected to result from several factors, including, without limitation, the following:

- Regulatory constraints that apply to the Funds managed by Crestline;
- Investment constraints imposed by the Investment Managers of the underlying fund that the Funds may invest in;
- The availability of underlying funds for investment at certain times but not at others; and
- The amount of cash available for investment at certain time by the Funds.

As a result of factors such as these, Funds that are managed *pari passu* may have a different investment portfolio (and, as a result, different performance results) even though the funds may have identical or substantially similar investment objectives.

This document may contain “forward-looking statements” within the United States Private Securities Litigation Reform Act of 1995. Statements that are predicative in nature, that depend upon or refer to future events or conditions or that include words such as “aims,” “expects,” “anticipates,” “intends,” “plans,” “believes,” “estimates,” “seeks,” “thinks,” and similar expressions are forward-looking statements. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results and performance to be materially different from any future results or performance expressed or implied by these forward-looking statements. Forward-looking statements are not guarantees, and they involve risks, uncertainties and assumptions. Although we make such statements based on assumptions that we believe to be reasonable, there can be no assurance that actual results will not differ materially from those expressed in the forward-looking statements.

Performance Disclosures

Per US GAAP, fair value estimates are made at a point in time, based on relevant market data as well as the best information available about the financial instrument. These estimates involve significant uncertainties and judgments and cannot be determined with precision. Because of the inherent uncertainty of valuation, this estimated value may differ from the value that would have been used had a ready market for these investments existed, and the differences could be material. Valuations reflect fair value estimates determined as of the dates indicated within this document.

Performance information is unaudited and subject to revision. Past performance as well as third party awards and ratings are not a guaranty of future results. Current and prospective investors should not assume that the future performance of any Crestline fund will equal its prior performance results or the results of any previous fund with a similar strategy, and investors risk loss of their entire investment. Each fund's performance results portrayed reflect the deduction of that fund's advisory fees, brokerage commissions and other expenses. The performance results also include the reinvestment of income and dividends, in investment vehicles where such are applicable. For each Crestline fund, an individual investor's returns will vary from the historical performance due to restrictions on participation in certain types of investments and due to the timing of subscriptions, withdrawals, and redemptions; further, the general economic conditions during extreme highs and lows may have affected the returns of the funds.

The targeted returns are forward-looking statements that are subject to uncertainties described further in the relevant offering memorandum. The targeted returns are based on research conducted by Crestline and the conclusions are Crestline's opinions based on its own independent study. The return targets are supported by various quantitative measures including 1) the actual track record of the funds, 2) back-tested returns of a pro-forma portfolio using the fund's current asset allocation and 3) a forecast return calculated using a third-party risk model. For further information on targeted returns including input data and calculation methodology please contact Client Servicing. While Crestline believes that the return targets are supportable, there is no guarantee that the funds will achieve the targeted returns. The targeted rates of return included in this presentation are hypothetical returns, and are for illustrative purposes only. Accordingly, no assumptions or comparisons should be made based upon these returns. Targeted returns are subject to inherent limitations, including but not limited to the fact that the returns do not take into account the impact that market and economic risks may have on investment decision trading. In no circumstances should the targeted returns be regarded as a representation, warranty or prediction that the fund will reflect any particular performance or that it will achieve or is likely to achieve any particular result or that investors will be able to avoid losses, including total losses of their investment.

The proposed allocations and proforma illustrations are hypothetical back-tested performance and are shown for illustrative purposes only and do not represent actual performance of any client account. Crestline does not represent that the hypothetical returns would be similar to actual performance had the firm actually managed the accounts in this manner.

Hypothetical, back-tested or simulated performances have many inherent limitations only some of which are described as follows: (i) It is designed with the benefit of hindsight, based on historical data, and does not reflect the impact that certain economic and market factors might have had on the decision-making process. No hypothetical, backtested or simulated performance can completely account for the impact of financial risk in actual performance. Therefore, it will invariably show positive rates of return. (ii) It does not reflect actual client asset trading and cannot accurately account for the ability to withstand losses. (iii) The information is based, in part, on hypothetical assumptions made for modeling purposes that may not be realized in the actual management of indices or accounts. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Assumption changes may have a material impact on the model returns presented. This material is not representative of any particular client's experience. Investors should not assume that they will have an investment experience similar to the hypothetical, back-tested or simulated performance shown. There are frequently material differences between hypothetical, back-tested or simulated performance results and actual results subsequently achieved by any investment strategy.

Unlike an actual performance record based on trading actual client portfolios, hypothetical, back-tested or simulated results are achieved by means of the retroactive application of a back-tested model itself designed with the benefit of hindsight. Hypothetical, back-tested or simulated performance does not reflect the impact that material economic or market factors might have on an adviser's decision making process if the adviser were actually managing a client's portfolio. The back-testing of performance differs from actual account performance because the investment strategy may be adjusted at any time, for any reason and can continue to be changed until desired or better performance results are achieved. The back-tested performance includes hypothetical results that do not reflect the reinvestment of dividends and other earnings or the deduction of advisory fees, brokerage or other commissions, and any other expenses that a client would have paid or actually paid. No representation is made that any index or account will or is likely to achieve profits or losses similar to those shown. Alternative modeling techniques or assumptions might produce significantly different results and prove to be more appropriate. Past hypothetical, back-test or simulated results are neither indicators nor guarantees of future returns. In fact, there are frequently sharp differences between hypothetical, back-tested and simulated performance results and the actual results subsequently achieved. As a sophisticated investor, you accept and agree to use such information only for the purpose of discussing with Crestline your preliminary interest in investing in the strategy described herein.

Performance Disclosures – Specialty Lending Fund I (SLFI)

As of 9/30/2020. The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses.

Considering these factors, the lowest reported investor Net IRR in each LP feeder is as follows (Net IRRs do not include any closing interest earned or paid to early closers):

US Feeder: 12.06%

Cayman Feeder: 11.31%

JPN Feeder: 11.78%

Canada Feeder: 11.80%

Performance Disclosures – Specialty Lending Fund II (SLFII)

As of 9/30/2020. The performance figures presented are for the entire fund and do not reflect the return for any specific investor. An individual investor's return would differ from what is presented herein based upon a variety of factors, including but not limited to, when the investor was admitted to the Fund and whether the investor is subject to certain fees and expenses.

Considering these factors, the lowest reported investor Net IRR in each LP feeder is as follows (Net IRRs do not include any closing interest earned or paid to early closers):

US Feeder: 11.66%

Cayman Feeder: 11.10%

JPN Feeder: 10.97%

Canada Feeder: 11.63%

Direct Alpha – Methodology Summary

Direct Alpha is a measure used to determine the out/underperformance of a private equity fund relative to a chosen public benchmark. While other PME benchmarking (Public Market Equivalent) methodologies exist, Direct Alpha is considered the most precise way to determine alpha (α) as defined in the traditional sense as return spread over an expected return/benchmark.

When calculating Direct Alpha, the actual contributions and distributions to/from the Fund from Limited Partners are compounded by the returns of the benchmark to a single point in time and combined with the actual quarter-end Limited Partner NAV to derive a future value net cash flow stream. The idea behind compounding the Fund's contributions and distributions to same point in time is to remove or nullify the impact of any changes in the benchmark (i.e., the returns generated) from the PE cash flows. The resulting IRR based on those future valued net cash flows no longer contains any changes of the benchmark, but only reflects the PE performance over or below the index/benchmark. This IRR is the Direct Alpha.

Indices

Correlations to the performance of the indices presented in this report (including, but not limited to the Cliffwater Direct Lending Index (CDLI), Cliffwater BDC Index (CWBDC), JPM Leveraged Loan Indices) are shown for comparison purposes only. The securities included in those indices are not necessarily included in the portfolios of the Crestline funds and criteria for inclusion in those indices are different and not limited to particular investment strategies. In addition, investors may not invest directly in an index. Therefore, the returns of Crestline funds and the returns of such indices may not be comparable.

Bank of America Merrill Lynch High Yield Master II Total Return Index

This data represents the ICE BofA US High Yield Index value, which tracks the performance of US dollar denominated below investment grade rated corporate debt publicly issued in the US domestic market. To qualify for inclusion in the index, securities must have a below investment grade rating (based on an average of Moody's, S&P, and Fitch) and an investment grade rated country of risk (based on an average of Moody's, S&P, and Fitch foreign currency long term sovereign debt ratings)

J.P. Morgan Leveraged Loan Index

The J.P. Morgan Leveraged Loan Index tracks the performance of U.S. dollar-denominated senior floating rate bank loans. The J.P. Morgan Leveraged Loan Index is designed to mirror the investable universe of U.S. dollar institutional leveraged loans, including U.S. and international borrowers.

S&P/LSTA US Leveraged Loan 100 Index

The S&P/LSTA U.S. Leveraged Loan 100 Index is designed to reflect the performance of the largest facilities in the leveraged loan market.

Bloomberg Barclays High Yield Bond ETF

An exchange-traded fund incorporated in the USA. The Fund seeks investment results that correspond to the price and yield of the Bloomberg Barclays High Yield Very Liquid Bond Index.

The Cliffwater Direct Lending Index (CDLI)

An index comprised of all underlying assets held by public and private Business Development Companies that satisfy certain eligibility requirements. The index is asset-weighted by reported fair value

The Cliffwater BDC Index (CWBDC)

An index that measures the performance of lending-oriented, exchange-traded Business Development Companies, subject to certain eligibility criteria regarding portfolio composition, market capitalization, and dividend history. The CWBDC is a capitalization-weighted index that is calculated on a daily basis using publicly-available closing share prices and reported dividend payouts. The CWBDC Total Return Index includes two components: 1) Income Return and 2) Price Return.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Crestline Specialty Lending Fund III ACTION: X
DATE: March 18-19, 2021 INFORMATION: _____

BACKGROUND:

In February 2015, the Alaska Retirement Management Board approved a commitment of \$50 million to Crestline Investors' Specialty Lending Fund (SLF I). In June 2017, ARMB approved a commitment of \$60 million to Crestline Investors' Specialty Lending Fund II (SLF II).

Crestline's SLF funds make strategic investments in sponsored and non-sponsored, directly originated senior secured loans to lower-middle and middle market companies. The strategy focuses on industries with recurring revenues, multi-site businesses, and/or with asset backing.

The SLF investment team is composed of 25 investment professionals with significant credit experience, industry specializations, and restructuring experience. Prior to joining Crestline, SLF leadership worked together at Goldman Sachs Special Situations Group between 2004 and 2011. At Crestline, SLF leadership built out their team with other key members from the Goldman Sachs Special Situations Group.

SLF II is approaching the end of its investment period in July 2021. Crestline is currently fundraising for the third lending fund (SLF III) with an identical strategy.

STATUS:

The portfolio construction and performance of SLF I and SLF II have been consistent with staff's expectations for targeted leverage, first lien exposure, default rates, and loss rates. The overall net IRR for SLF I and SLF II was 12.2% and 12.1%, respectively, as of September 30, 2020.

Staff has regularly monitored and reviewed the performance of SLF I and SLF II and has evaluated the investment opportunity for SLF III leading to the recommendation to make a commitment up to \$100 million to Crestline Specialty Lending Fund III, L.P.

RECOMMENDATION:

That the Alaska Retirement Management Board direct staff to negotiate with Crestline Investors for a commitment of up to \$100 million to Crestline Specialty Lending Fund III, L.P.

PineBridge Investments

Mandate: Tactical Allocation

Hired: 2018

Firm Information	Investment Approach	Total ARMB Mandate
<p>PineBridge Investments is a private global asset manager focused on active high-conviction investing. The firm is majority-owned by a subsidiary of Pacific Century Group, as Asia-based private investment group. PineBridge was formerly the asset management division of AIG and has been independent since 2010.</p> <p>As of 12/31/2020, the firm's total assets under management were \$126.3 billion.</p> <p>Key Executives: <i>Michael Kelly, Managing Director</i> <i>Sunny Ng, Managing Director</i> <i>Deanne Nezas, Managing Director</i> <i>Joe Fague, Senior Vice President</i> <i>Joy Booker, Senior Vice President</i></p>	<p>The PineBridge Global Dynamic Asset Allocation strategy is a multi-asset class portfolio whose objective is to deliver CPI +5% returns, and 200 bps of excess return over the benchmark, over a full market cycle.</p> <p>The portfolio is constructed based on PineBridge's 5-year capital market line (CML). A portfolio risk level relative to the benchmark is set based on the assessment of the capital market line and investment convictions around an intermediate-term time horizon. An optimal portfolio is created based on this view with a preference for those asset classes with the highest expected Sharpe Ratios. The CML is updated on a quarterly basis.</p> <p>The ARMB strategy uses more passive building blocks than PineBridge's traditional portfolio to achieve lower fees.</p> <p>Benchmark: 60% MSCI ACWI, 40% Bloomberg Barclays Global Treasury</p>	<p>Assets Under Management (\$millions): 12/31/2020: \$581</p>

Concerns: None

12/31/2020 Performance (gross of fees)

	<u>Last Quarter</u>	<u>1-Year</u>	<u>2-Years Annualized</u>	<u>5-Years Annualized</u>
PineBridge	13.98%	13.64%	14.41%	-
Benchmark	10.09%	14.26%	16.13%	-



A Presentation to:

Alaska Retirement Management Board

March 19, 2021

Global Dynamic Asset Allocation

Portfolio Review

Michael J. Kelly, CFA
Managing Director,
Global Head of Multi-Asset
PineBridge Investments, New York

Deanne Nezas, CFA, FSA, MAAA
Managing Director,
Portfolio Manager, Global Multi-Asset
PineBridge Investments, New York

Capital at Risk: All investments involve risk. The value of your investment and the income from it will fluctuate and a loss of capital may occur. This material must be read in conjunction with the Disclosure Statement.

Speaker Biographies



Michael J. Kelly, CFA
Managing Director,
Global Head of Multi-Asset
PineBridge Investments,
New York

Mr. Kelly joined the firm in 1999 and is responsible for overseeing the firm’s global multi-asset business. Mr. Kelly founded the firm’s multi-asset investment process and integrated several formerly independent regional balanced teams into one global team focused on total-return-oriented asset allocation, as well as manager selection. Today, the team’s flagship total return strategy has one of the longest track records focused on CPI + 5%-oriented investing (over rolling five-year periods) versus a relative return investment strategy. Mr. Kelly also serves as a member of the firm’s Governance Committee, and Management Committee and chairs the firm’s Proxy Committee. Prior to joining the firm, he spent 15 years in various equity research and portfolio management roles at J.P. Morgan Investment Management. During his last five years at J.P. Morgan, he also chaired the firm’s US Asset Allocation Committee. Prior to that, he spent several years in economic research at the economic consulting firm Townsend-Greenspan & Co. He holds an MBA from the Wharton Graduate School of Business. He also is a CFA charterholder.



Deanne Nezas, CFA, FSA, MAAA
Managing Director,
Portfolio Manager, Global
Multi-Asset
PineBridge Investments,
New York

Ms. Nezas joined the firm in 2003 and is a senior member of the Global Multi-Asset Team’s portfolio implementation function, primarily responsible for managing separate account client portfolios. She also leads the team’s effort to source and conduct due diligence on private assets. Prior to her current role, Ms. Nezas served as Vice President of Product Management in the International Retirement Services group, where she partnered with the firm’s life insurance affiliates in Japan, Korea, and Southeast Asia to grow their retirement services businesses, including individual and group pensions and retail mutual funds. Ms. Nezas has more than 30 years of experience in the financial services industry. Before joining the firm, Ms. Nezas was a key member of the management teams at Allstate Life and Hartford Life. She also had P&L responsibility for the individual and group pension business of Travelers Life and Annuity. Prior to that, she was a Principal and Consulting Actuary in the Chicago office of Milliman USA. Ms. Nezas holds a Bachelor of Science degree in mathematics with a minor in business administration from the University of Wisconsin in River Falls. She is a CFA charterholder, a fellow in the Society of Actuaries, and a member of the American Academy of Actuaries.

I. Firm & Team Update

II. Market & Performance Overview

III. Current Positioning & Portfolio

IV. Investment Outlook

V. Intermediate Term Asset Class Convictions

VI. Appendices & Disclosures

Section I

Firm & Team Update

A Heritage of Active High Conviction Investing

PineBridge Investments

We are a **private, global asset manager** with a **focus on active, high conviction investing**

Independent since 2010, the firm draws on **decades of investment experience and a history** of managing money for sophisticated investors

Our clients include **corporate and public pensions, insurance companies, sovereign wealth funds, intermediaries and high net worth individuals**

The firm has more than 700 employees, including 200 investment professionals¹ in **21 office locations** around the world.

Total Firm AUM: US \$126.3 bn.

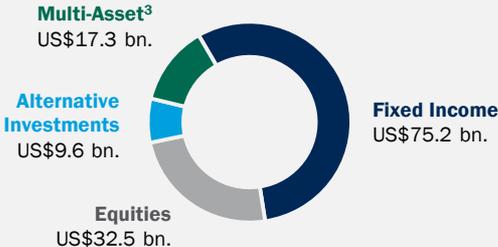
Client AUM By Region²



AUM by Channel²



Investment Capabilities²



Data as of 31 December 2020. ¹ Investment professionals include portfolio managers, research analysts, traders, portfolio strategists and product specialists, and are subject to change. ² US\$27.6 billion (US\$18.3 billion equities, US\$9.3 billion fixed income) of assets managed by joint ventures or other entities not wholly owned by PineBridge Investments. Includes PineBridge Benson Elliot Real Estate AUM of US\$3.2 billion. ³ Multi-Asset includes US\$8.4 billion allocated opportunistically by the Multi-Asset team to PineBridge equity, fixed income and alternative strategies. Due to rounding totals are approximate.

A Global Team Approach

Experienced and Stable Team Leverages PineBridge's Ecosystem

Michael Kelly
 Global Head of Multi-Asset
 New York
 35 Years of Experience

Strategy & Research

- Hani Redha**
Managing Director
London
21 Years of Experience
- Magali Azema-Barac**
Managing Director
Melbourne
27 Years of Experience
- Steven Lin**
Managing Director
New York
23 Years of Experience
- Jonathan DePeri**
Vice President
New York
13 Years of Experience
- Mikhail Johaadien**
Vice President
London
11 Years of Experience

Manager Selection

- Chair PB ESG Committee
- Paul Mazzacano**
Managing Director
New York
26 Years of Experience
- Eric Hsing**
Senior Manager
Taipei
15 Years of Experience
- Allison Fang**
Senior Manager
Taipei
10 Years of Experience

Economics

- Markus Schomer**
Managing Director
New York
26 Years of Experience
- Paul Hsiao**
Vice President
Hong Kong
6 Years of Experience

Portfolio Implementation

- Peter Hu**
Managing Director
New York
16 Years of Experience
- Chair ESG MA Process
- Deanne Nezas**
Managing Director
New York
35 Years of Experience
- Jose Aragon**
Senior Vice President
New York
18 Years of Experience
- Austin Strube**
Vice President
New York
9 Years of Experience
- Sean Jo**
Vice President
New York
9 Years of Experience
- Jonathan DiMola**
Vice President
New York
8 Years of Experience
- Sunny Ng**
Managing Director
New York
17 Years of Experience
- Mary Nicola**
Senior Vice President
Singapore
12 Years of Experience
- Zuma Vallejo-Howard**
Vice President
New York
6 Years of Experience
- Kimberly Tong**
Senior Analyst
Hong Kong
4 Years of Experience

Team members in

- New York
- Hong Kong
- London
- Melbourne
- Singapore
- Taipei



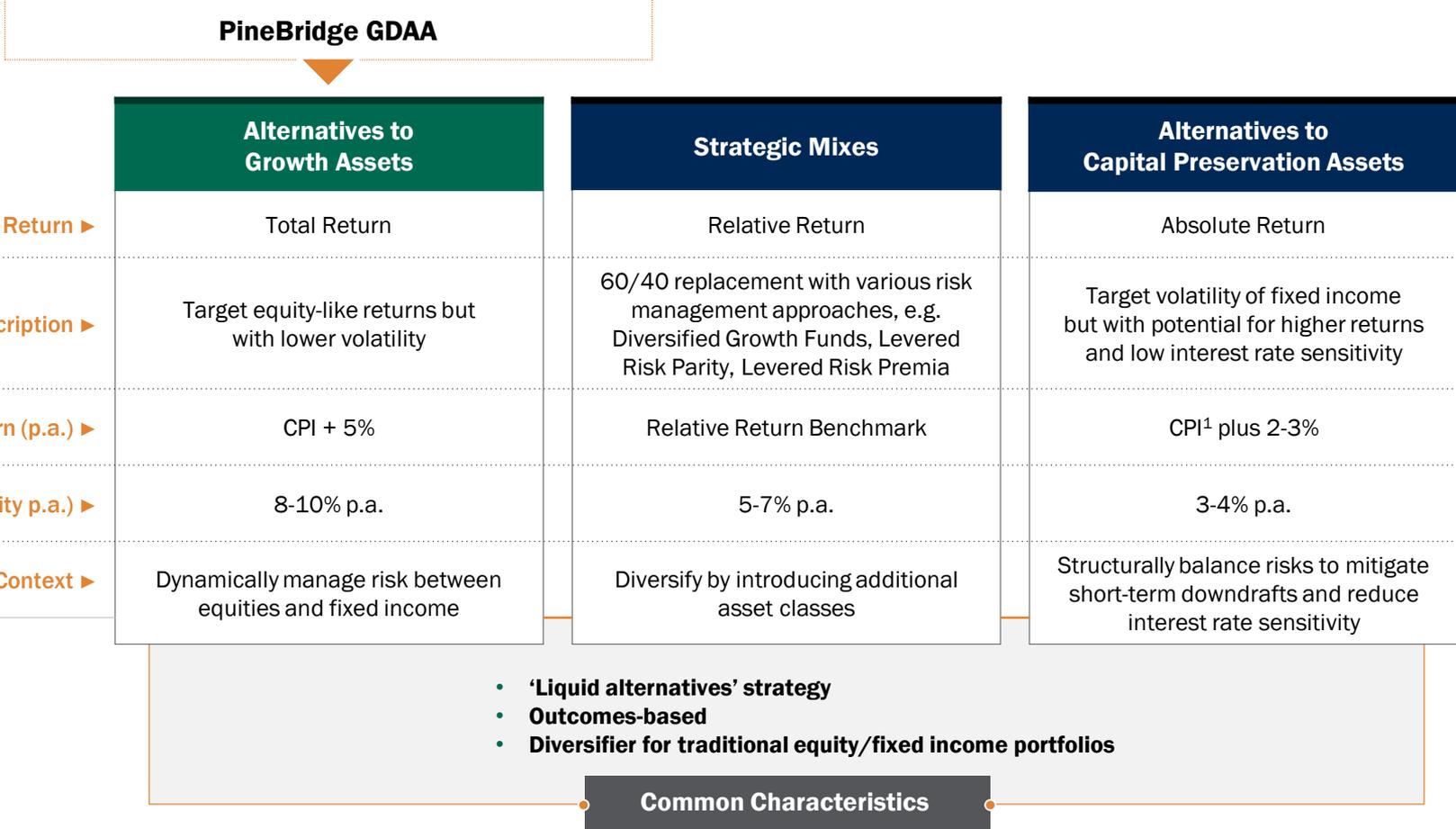
PineBridge's global network of investment professionals¹

<p>Fixed Income</p> <p>Steven Oh Managing Director, Global Head of Credit & Fixed Income Los Angeles</p>	<p>Equity</p> <p>Anik Sen Managing Director, Global Head of Equities New York</p>	<p>Rates and Macro</p> <p>Roberto Coronado Senior Vice President, Portfolio Manager London</p>	<p>Global FX</p> <p>Anders Faergemann Managing Director, Senior Sovereign PM London</p>	<p>Economics</p> <p>Markus Schomer Managing Director, Chief Economist New York</p>	<p>Alternatives</p> <p>Steve Costabile Managing Director, Global Head of Private Funds Group New York</p>
--	---	--	---	--	---

As of 31 January 2021. ¹Investment professionals include portfolio managers, research analysts, traders, portfolio strategists, and product specialists; subject to change.

Multi-Asset Solutions Meet Different Portfolio Needs

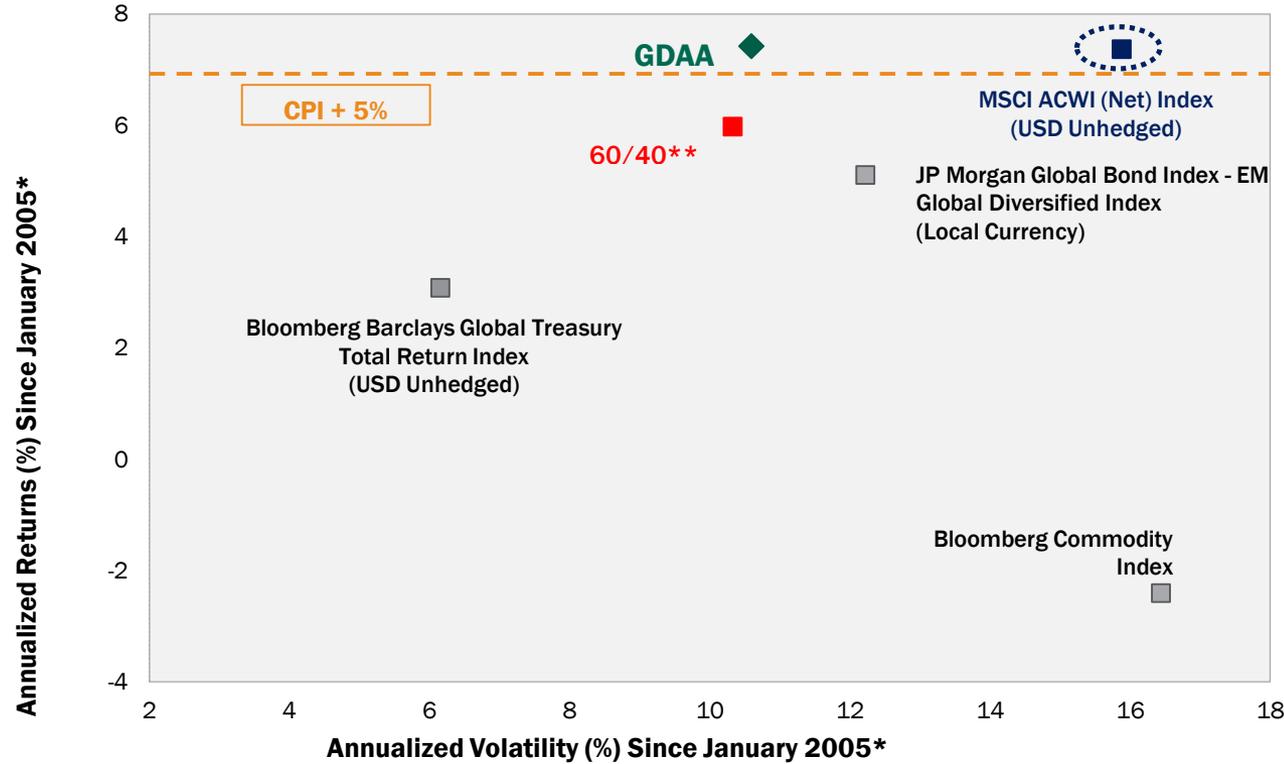
GDAAs: An Alternative to Growth Assets.



As of 31 January 2021. There is no assurance that any investment objective or target will be achieved. Please refer to the Sound Basis Disclosure. The targeted returns provided are used as an estimated guideline or comparative measure regarding annual performance returns averaged over a time horizon. They reflect a guideline which the investment manager considers reasonable having considered the current industry and interest rate environment as well as quantitative and qualitative analyses. If one or more of the assumptions used in the formulation of the targeted returns turns out to be incorrect, the target may not be achieved. Targeted returns do not take into account unanticipated material changes in the market and/or other economic conditions affecting the investments, transaction costs that may arise, the imposition of taxes and the actual sale or trade of investments. Targeted returns should not be relied upon. Strategic Mixes and Alternatives to Capital Preservation Assets do not represent PineBridge products and are offered for purposes of comparison only. ¹CPI is defined as US CPI ex-food & energy.

Targets Total Return (CPI¹ + 5%) With 1/3rd Less Risk Than Equities

Annualized Returns and Volatility



Preliminary as of 31 January 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Reflects the performance of the PineBridge Multi-Asset Composite (the "Composite"). The performance returns in this presentation do not reflect the deduction of management and incentive fees and expenses and would be reduced by such fees and other expenses. The performance results presented are gross of fees and do not reflect the deduction of investment advisory fees and expenses. **There is no assurance that any investment objective or target will be achieved.** Please refer to the Sound Basis Disclosure in the Appendix. For further performance information, as well as the Composite's complete benchmark information, please see the Schedule of Rates of Return and Notes to the Schedule of Rates of Return. **Past performance is not indicative of future results.** ¹US CPI ex-food and energy. *Annualized Returns and Annualized Volatility are shown since inception of the PineBridge Multi-Asset Composite. The inception date of the Composite is 1 January 2005. **The 60/40 Risk Budget represents 60% MSCI ACWI (Net) Index/40% FTSE World Government Bond Index (USD Unhedged) from 1 January 2005 to 31 July 2018 and 60% MSCI ACWI (Net) Index/40% Bloomberg Barclays Global Treasury Total Return Index (USD Unhedged) from 1 August 2018 to date. Risk budget is the overall portfolio's risk which seeks to average to the risk of 60/40 global equity/global bond mix over full cycles. Effective 1 October 2019, the primary benchmark was retroactively switched to CPI+5% and renamed the primary objective, and the secondary benchmark was retroactively changed to 60/40 and renamed the risk budget. For net return performance, please refer to P.36. ^ Please note the outperformance is calculated based on the respective performance from the Multi-Asset Composite and MSCI ACWI, and compared it with the CPI + 5% throughout the entire time series since inception.

Designed for Different Market Regimes

De-risked first into cash in 2007 and increased pace by moving into **US Treasuries** in 2008

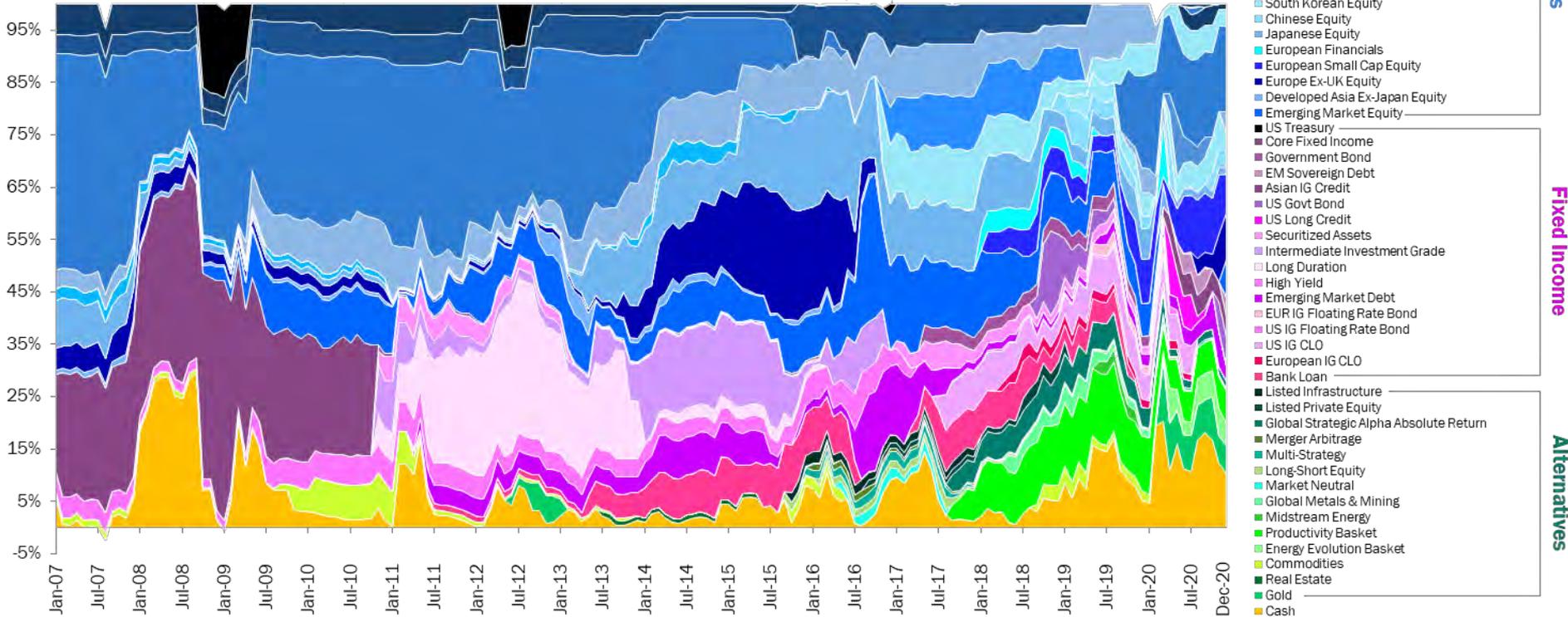
Re-risked by reducing cash and increasing allocation to **US Large Cap & Small Cap Equities** in 2009

Increased **Long Credit Duration** as we viewed slower steepening of yield curve than consensus and exited **Commodities** and considering decreased China demand post super-cycle

Starting in 2013, increased allocations to **European Equities** and **Japanese Equities** with accommodative monetary policies, fiscal stimuli, and structural reform, while getting cautious on **US Equities**

Starting June 2016, significantly de-risked out of **European Equities** in advance of UK Referendum

November 2016 – Repositioned for reflationary regime by increasing allocations to selective pockets within **US Equities** (Financials, Small Cap)



Source: PineBridge Investments as of 31 December 2020. For illustrative purposes only. We are not soliciting or recommending any action based on this material. This information reflects the month end allocations distributed across a Representative Account, which represented a member of the PineBridge Multi-Asset Composite ("Composite") from January 2007 to August 2017, and the month end overall Composite allocations as of March 2018. The Representative Account comprised a majority of the Composite and exhibited other characteristics typical of the accounts in the Composite. There can be no assurance that any of the above allocations will remain in the Composite at the time this information is presented. The inception of the Composite is 1 January 2005. For the Composite's complete benchmark information, please see the Schedule of Rates of Return and Notes to the Schedule of Rates of Return. The regional break-out for sub strategies following an EAFE mandate has been estimated based on MSCI EAFE country weights. ¹High Yield is inclusive of U.S. High Yield and European Contingent Convertible Bonds. ²Productivity Basket is constituted from a blended allocation to stocks of companies that provide productivity-enhancing technologies towards growing capital expenditure intentions globally.

Section II

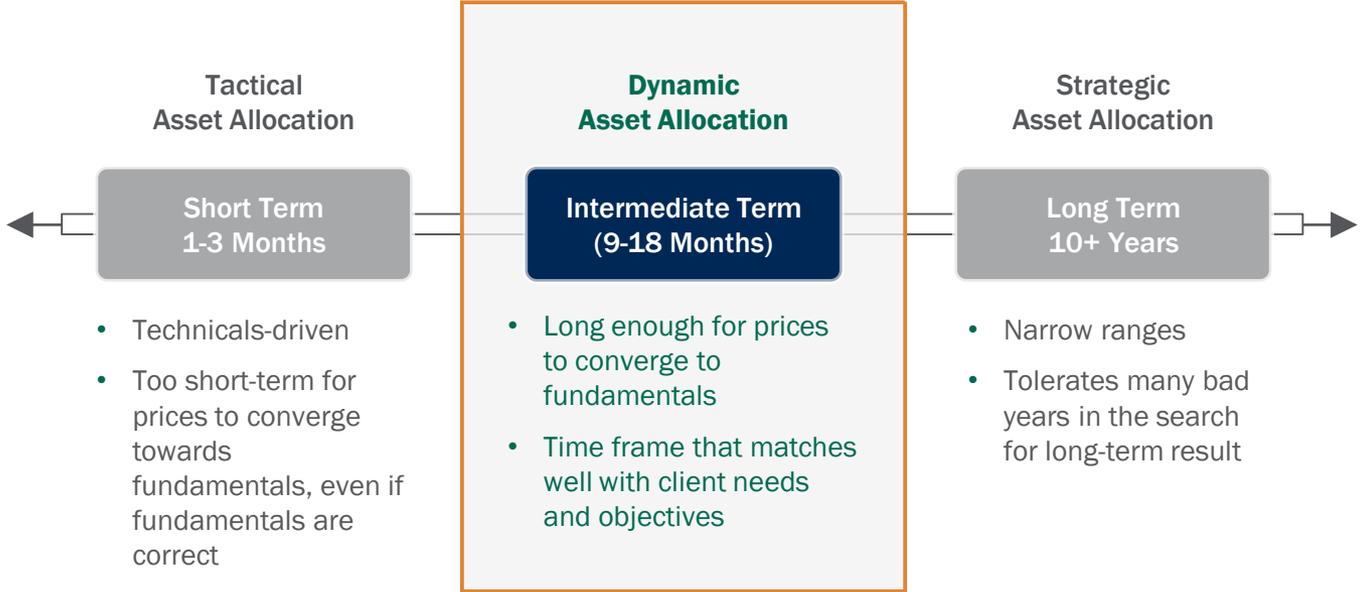
Investment Philosophy and Process

Investment Philosophy

We Believe

<p>Fundamentals ultimately drive markets</p>	<p>An intermediate time horizon allows market prices to converge towards fundamentals</p>	<p>Each cycle is unique</p>	<p>A culture that supports and encourages differences in opinion drives better investment outcomes</p>	<p>Risk and return are equally important</p>	<p>Diversification alone fails to protect during periods of stress</p>
---	--	------------------------------------	---	---	---

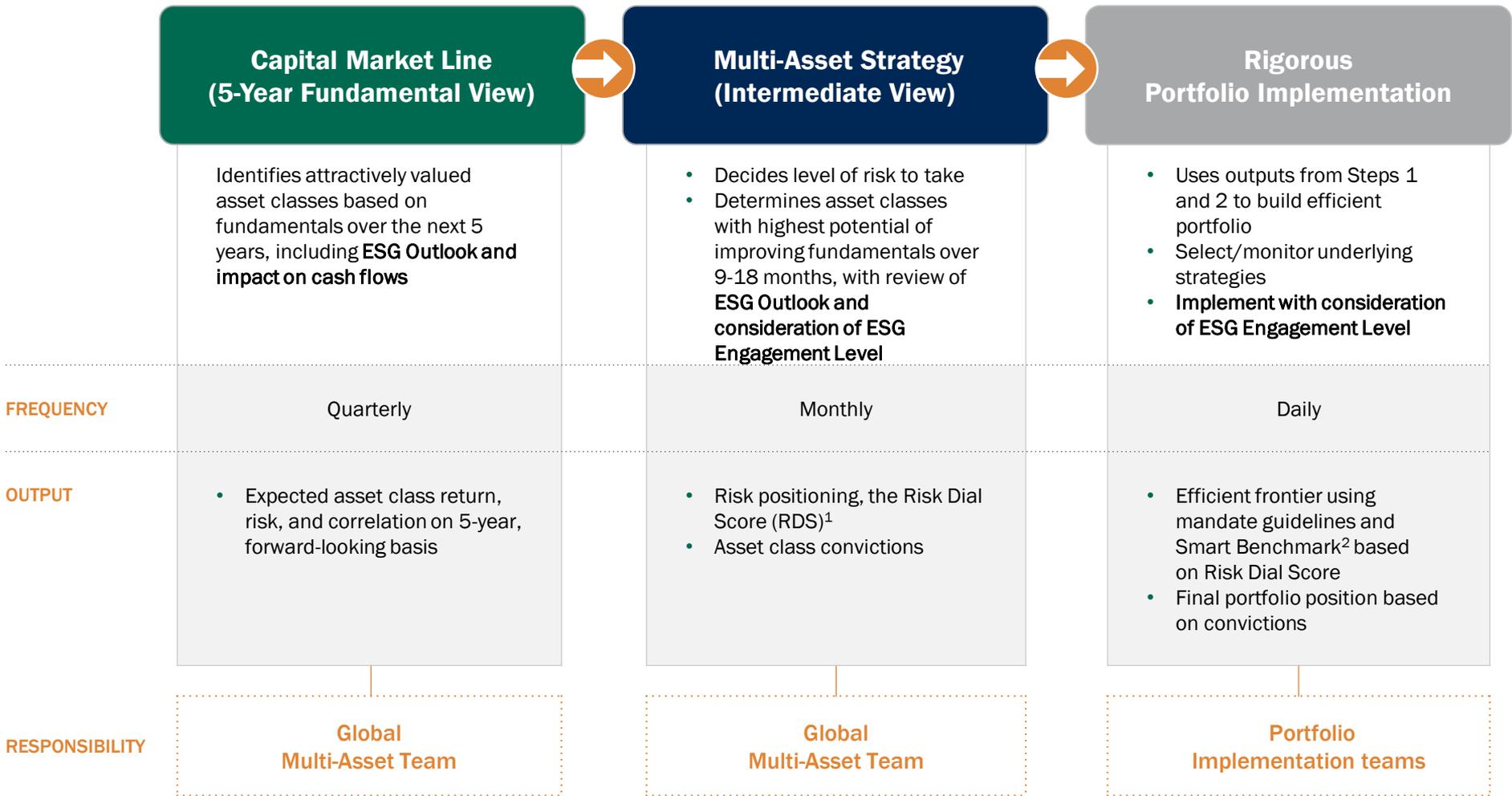
PineBridge's Approach to Dynamic Asset Allocation is based on an intermediate-term perspective, allowing opportunistic positioning with wide asset class ranges



Any views represent the opinion of the investment manager and are subject to change. There is no assurance that any investment objective will be achieved.

Investment Process

Time-Tested, Methodical, and Repeatable Process



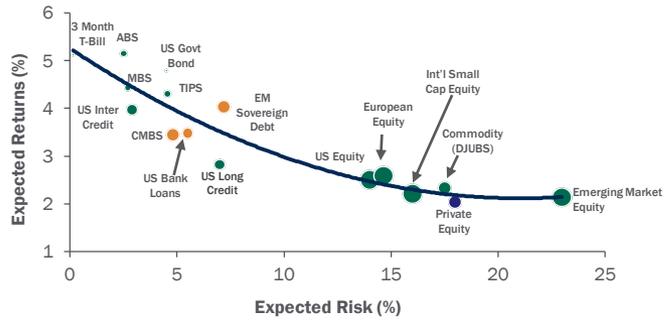
¹Numeric score determined by Investment Team indicative of its relative preference towards risk; 1 – most risk-seeking; 3 – neutral; 5 – most risk-averse. ²Smart Benchmark is the selected point on the efficient frontier that reflects the Risk Dial Score; it is the most efficient portfolio that the portfolio implementation step uses as a basis prior to over or underweighting this portfolio based on intermediate term asset class convictions.

Investment Process

Evolving Capital Market Line Anchors Our View on Fundamentals

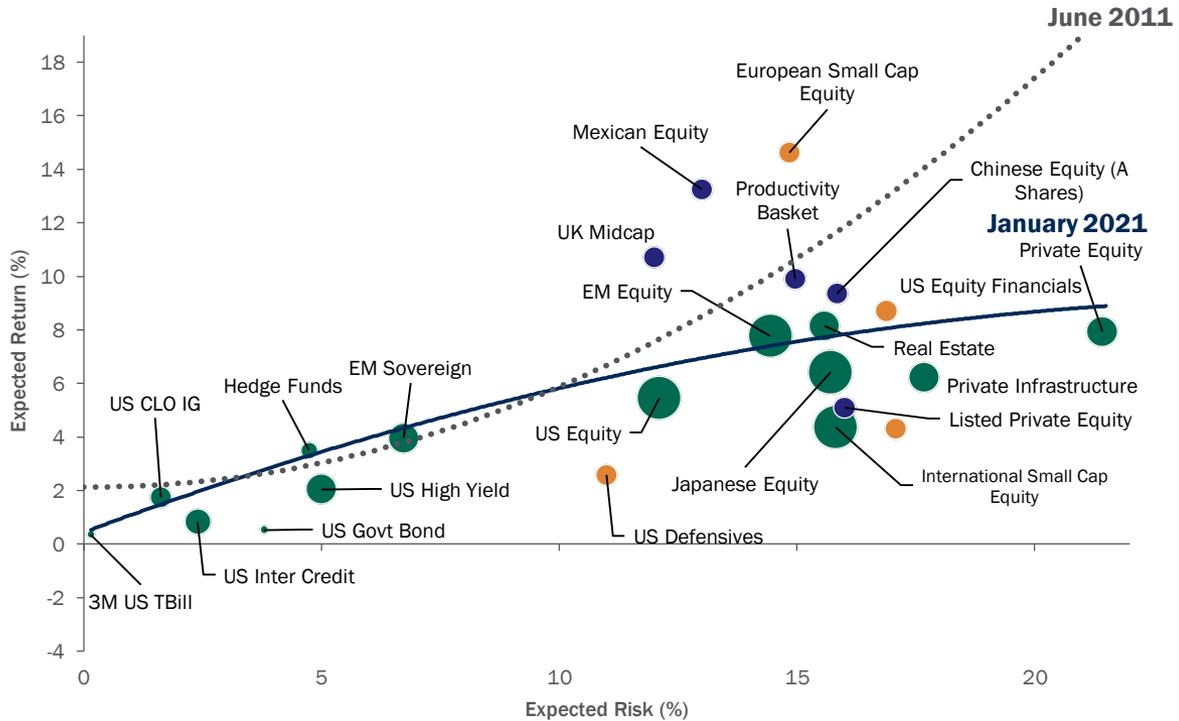
June 2007

Inverted with low dispersion



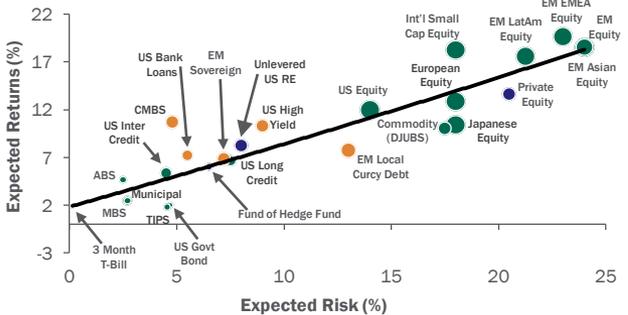
January 2021

Upward sloping line with high dispersion indicating selective opportunities



June 2009

Upward sloping with low dispersion



As of 31 January 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. **Past performance is not indicative of future results. There is no assurance that any investment objective will be achieved.** Represents the local currency view of the PineBridge Capital Market Line (CML). Based on PineBridge's estimates of forward-looking 5-year returns and standard deviation. The CML is not intended to represent the return prospects of any PineBridge products, only the attractiveness of asset class indexes, compared across the capital markets. There can be no assurance that the expected returns will be achieved over any particular time horizon. This information may constitute "projections," "forecasts" or other "forward-looking statements" which do not reflect actual results and are based primarily upon applying a set of assumptions to certain financial information. See Multi-Asset Endnotes for further information.

Section III

Market & Performance Overview

Pinebridge GDA Total Return

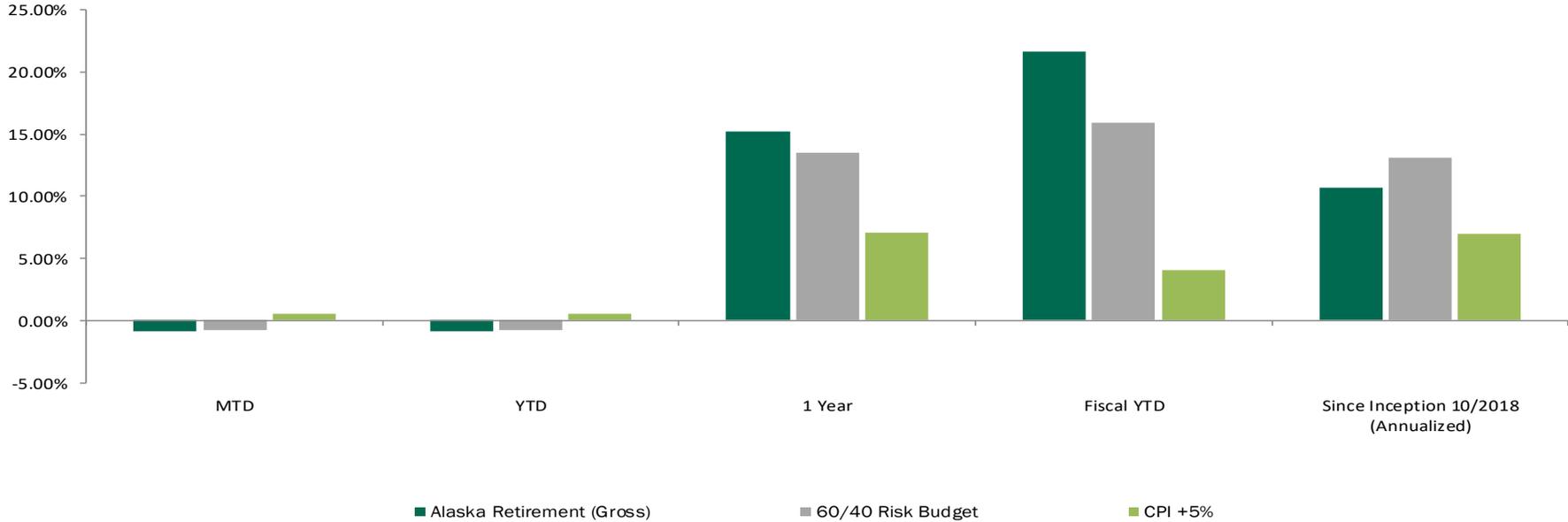
Peer Performance Comparisons

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Liquid Alternative Universe						
PineBridge GDA	13.25	13.90	13.90	6.08	6.86	7.40
Long Biased MAC	8.45	9.20	9.20	5.66	6.86	6.01
Multi-Asset Class (MAC) Peer Group	7.19	4.10	4.10	4.59	6.69	6.14
Absolute Return MAC	3.47	4.53	4.53	3.10	3.71	4.30
Risk Premia MAC	-1.02	-11.76	-11.76	-4.25	0.56	5.83
Risk Parity MAC	7.89	3.19	3.19	5.75	8.66	7.35
Over/under Performance	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
(PineBridge GDA) - Long Biased MAC	4.80	4.70	4.70	0.42	0.00	1.39
(PineBridge GDA) - Multi-Asset Class (MAC) Peer Group	6.06	9.80	9.80	1.49	0.17	1.26
(PineBridge GDA) - Absolute Return MAC	9.78	9.37	9.37	2.98	3.15	3.10
(PineBridge GDA) - Risk Premia MAC	14.27	25.66	25.66	10.33	6.30	-
(PineBridge GDA) - Risk Parity MAC	5.36	10.71	10.71	0.33	-1.80	0.05

Alaska Retirement Management Board

As of 31 January 2021

	Market Value	Inception Date	MTD	YTD	1 Year	Fiscal YTD	Since Inception 10/2018 (Annualized)
Alaska Retirement (Gross)	\$ 576,124,999	10/31/2018	-0.88%	-0.88%	15.24%	21.64%	10.69%
60/40 Risk Budget			-0.74%	-0.74%	13.53%	15.88%	13.06%
CPI +5%			0.57%	0.57%	7.04%	4.04%	7.01%
Over/Under Performance			-0.14%	-0.14%	1.71%	5.76%	-2.37%



The risk budget for the portfolio is 60% MSCI All Country World Index (Net) + 40% Bloomberg Barclays Global Treasury Total Return Index Value Unhedged. Performance for periods less than one year is not annualized. Past performance is not indicative of future results.

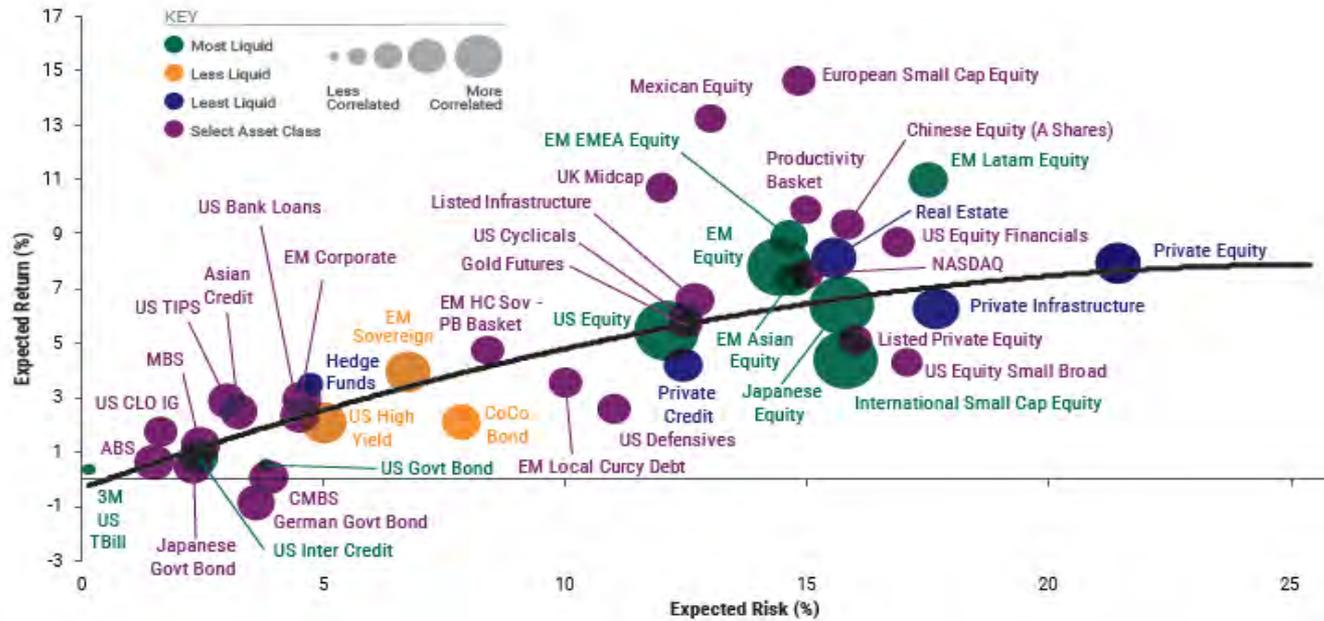
Section IV

Current Positioning & Portfolio

Current Positioning

As of 31 January 2021

Capital Market Line (Local Currency View)



Dot Color = Liquidity <ul style="list-style-type: none"> Most Liquid Less Liquid Least Liquid 	Dot Size = Degree of Correlation Large: More Correlated Small: Less Correlated	Position = Valuation Above Line: Attractively valued On Line: Fairly valued Below Line: Unattractively valued
--	---	---

Multi-Asset Strategy

Risk Dial Score¹: 2.30

	Positive Convictions	Negative Convictions
Equity	<ul style="list-style-type: none"> US Cyclical US Financials European Small Caps Spanish Equity 	<ul style="list-style-type: none"> US Defensives
Fixed Income	<ul style="list-style-type: none"> EM Corporate Asian IG USD Credit EM Sovereign HY 	<ul style="list-style-type: none"> DM Government Bonds
Alternatives	<ul style="list-style-type: none"> Gold Energy Evolution Basket 	<ul style="list-style-type: none"> Listed Private Equity

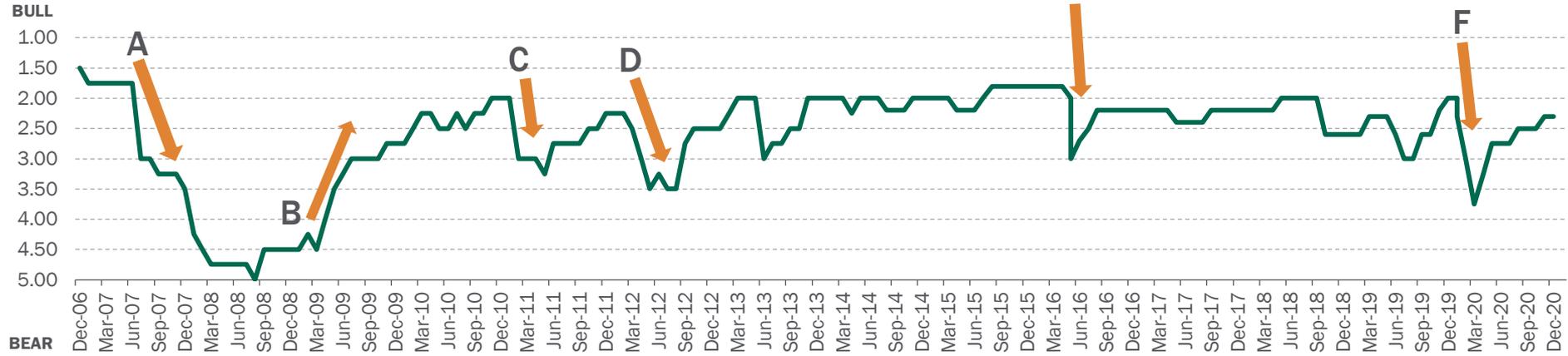
As of 31 January 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. **Past performance is not indicative of future results. There is no assurance that any investment objective will be achieved.** Represents the local currency view of the PineBridge Capital Market Line (CML). Based on PineBridge's estimates of forward-looking 5-year returns and standard deviation. The CML is not intended to represent the return prospects of any PineBridge products, only the attractiveness of asset class indexes, compared across the capital markets. There can be no assurance that the expected returns will be achieved over any particular time horizon. This information may constitute "projections," "forecasts" or other "forward-looking statements" which do not reflect actual results and are based primarily upon applying a set of assumptions to certain financial information. See Multi-Asset Endnotes for further information. Note that the CML's shape and positioning were determined based on the larger categories and do not reflect the subset categories of select asset classes, which are shown to relative to other asset classes only. *Productivity Basket is constituted from a blended allocation to stocks of companies that provide productivity-enhancing technologies towards growing capital expenditure intentions globally.

¹ Numeric score determined by Investment Team indicative of its relative preference towards risk; 1 - most risk-seeking; 3 - neutral; 5 - most risk-averse.

Investment Process

Historical Risk Dial Scores

The Risk Dial Score (RDS) is a qualitative assessment of the team’s relative preference towards risk and is based on the CML slope and dispersion in conjunction with the direction of fundamentals over the next 9-18 months; 5 is BEAR, 1 is BULL.

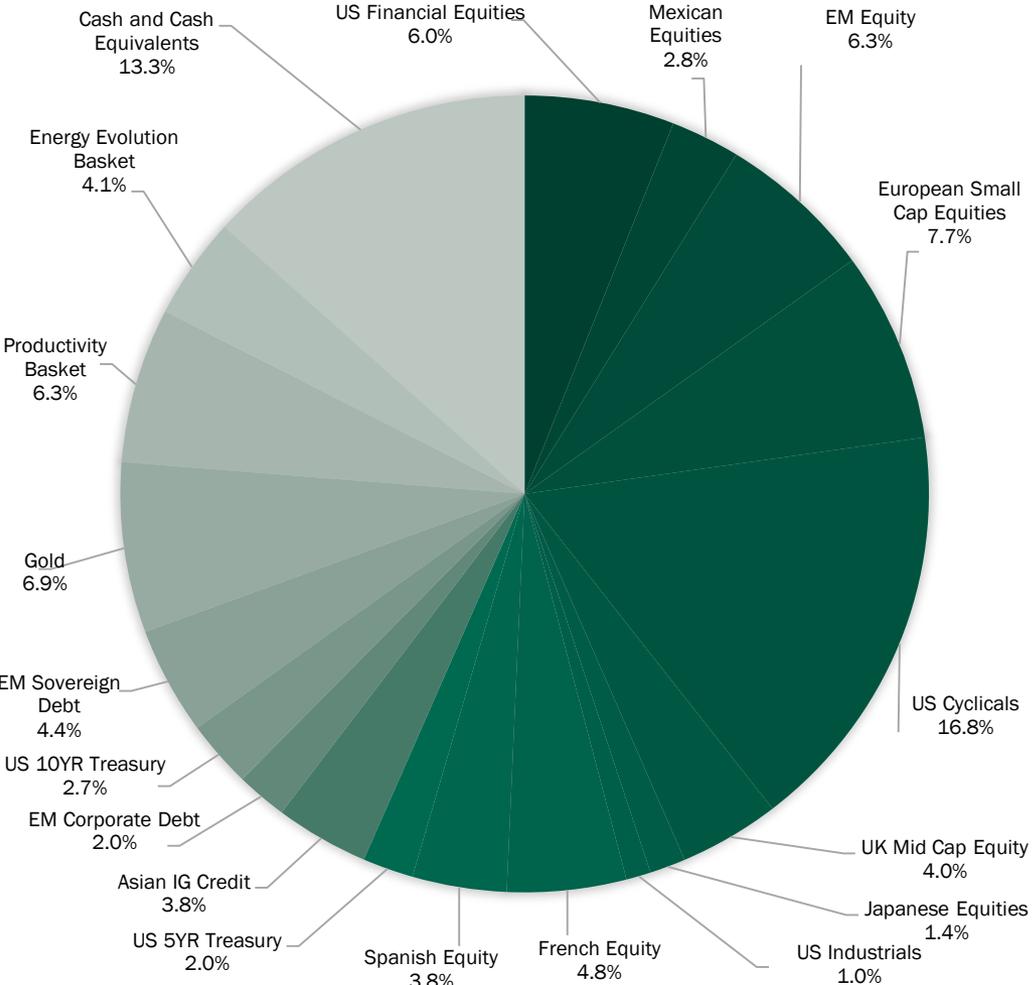


Time Period	Description
A De-risking Q3 2007 to Q2 2008	Inverted CML, combined with growing uncertainty in market sentiment across PineBridge's set of monthly asset class meetings was indicative of need to de-risk over the intermediate-term. Started de-risking in late 2007 and the pace of de-risking was increased in 2008.
B Re-risking Q1 2009 to Q2 2009	A steep, positively sloped CML combined with strong central bank and Treasury support indicative of rapidly strengthening fundamentals over the intermediate-term. Translated into an upswing of recovery.
C De-risking Q4 2010 to Q1 2011	Feared downdraft in fundamentals over 9-18 month period. Forecasted slower period going forward for risk assets, as nearly all countries entered or broadened their monetary exit strategies.
D De-risking Q4 2011 to Q2 2012	Feared downdraft in fundamentals over 9-18 month period. Throughout recovery from 2011, many including the Team had concerns around the sputtering out of the global economy.
E De-risking June 2016	Based on asymmetric risk return profile between the binary unknowable outcomes of “Remain” and “Leave”, we de-risked in advance of Brexit to RDS 3.0, and then ending the month with RDS 2.7 on the basis of growth, albeit at a shallower trajectory going forward.
F De-risking Q1 2020	The exogenous shock of the lockdowns in response to COVID-19 led us to de-risk the portfolio materially as the economy abruptly moved from mid to early cycle. As a result we moved our RDS from 2.0 to 3.75 over the quarter.

As of 31 January 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any views represent the opinion of the investment manager and are subject to change.

Current Portfolio and Allocation Changes (Alaska)

Current Portfolio (31 January 2021)



	12/31/2020	1/31/2021	+/-
US Financial Equities	3.3%	6.0%	2.7%
Mexican Equities	1.0%	2.8%	1.8%
EM Equity	6.0%	6.3%	0.3%
European Small Cap Equities	7.6%	7.7%	0.1%
US Cyclical	16.7%	16.8%	0.1%
UK Mid Cap Equity	4.0%	4.0%	0.0%
Japanese Equities	1.4%	1.4%	0.0%
US Industrials	1.0%	1.0%	0.0%
French Equity	4.9%	4.8%	-0.1%
Spanish Equity	3.9%	3.8%	-0.1%
Chinese Equity	3.0%	0.0%	-3.0%
South Korean Equity	3.6%	0.0%	-3.6%
Total	56.3%	54.5%	-1.8%

	12/31/2020	1/31/2021	+/-
US 5YR Treasury	0.0%	2.0%	2.0%
Asian IG Credit	3.7%	3.8%	0.0%
EM Corporate Debt	2.0%	2.0%	0.0%
US 10YR Treasury	2.7%	2.7%	0.0%
EM Sovereign Debt	4.4%	4.4%	0.0%
US 30YR Treasury	2.7%	0.0%	-2.7%
Total	15.5%	14.9%	-0.6%

	12/31/2020	1/31/2021	+/-
Gold	5.6%	6.9%	1.3%
Productivity Basket	6.3%	6.3%	0.0%
Energy Evolution Basket	4.1%	4.1%	0.0%
Total	16.0%	17.3%	1.3%

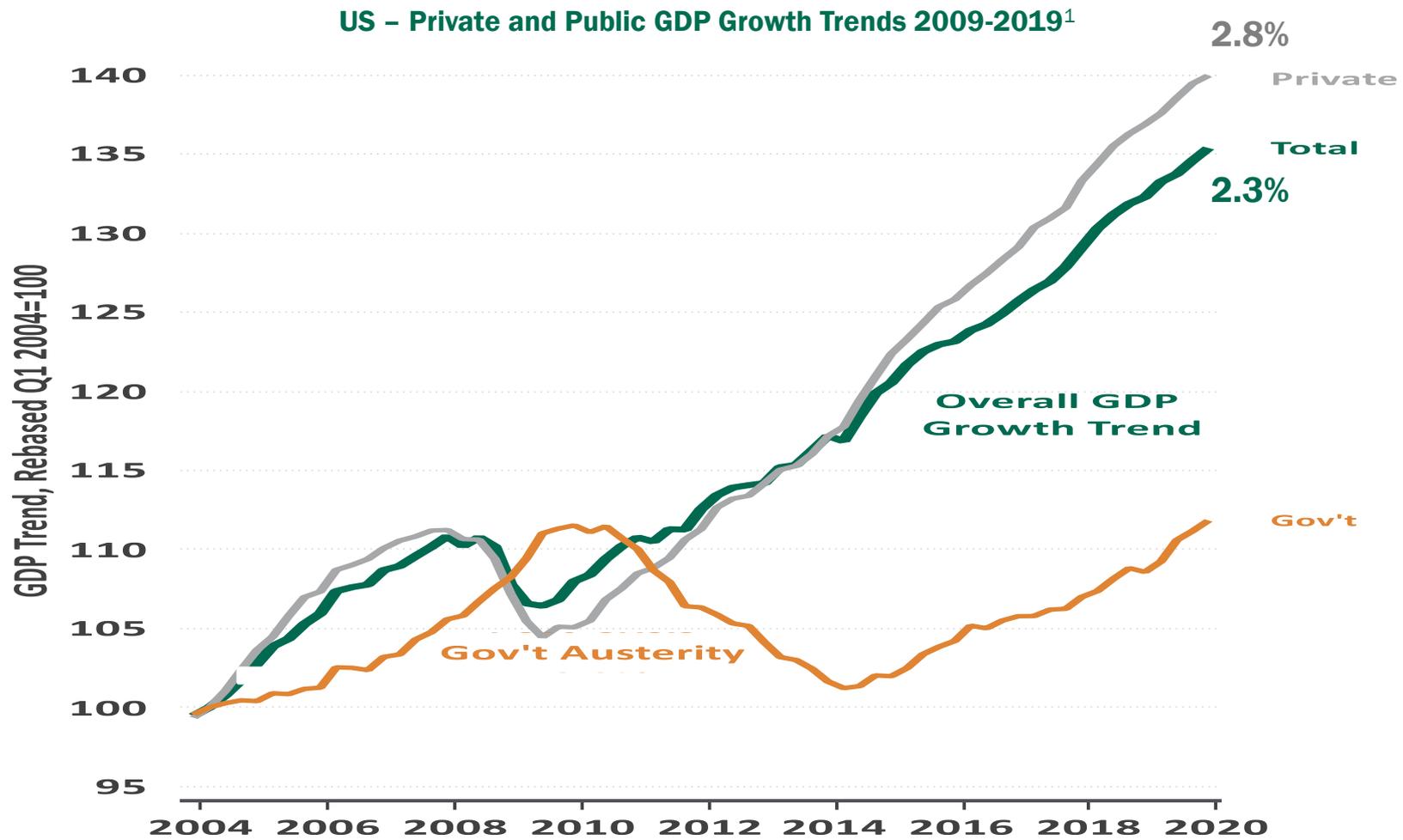
	12/31/2020	1/31/2021	+/-
Cash and Cash Equivalents	12.2%	13.3%	1.2%
	100.0%	100.0%	

Total may not add up to 100% due to rounding.

Investment Outlook

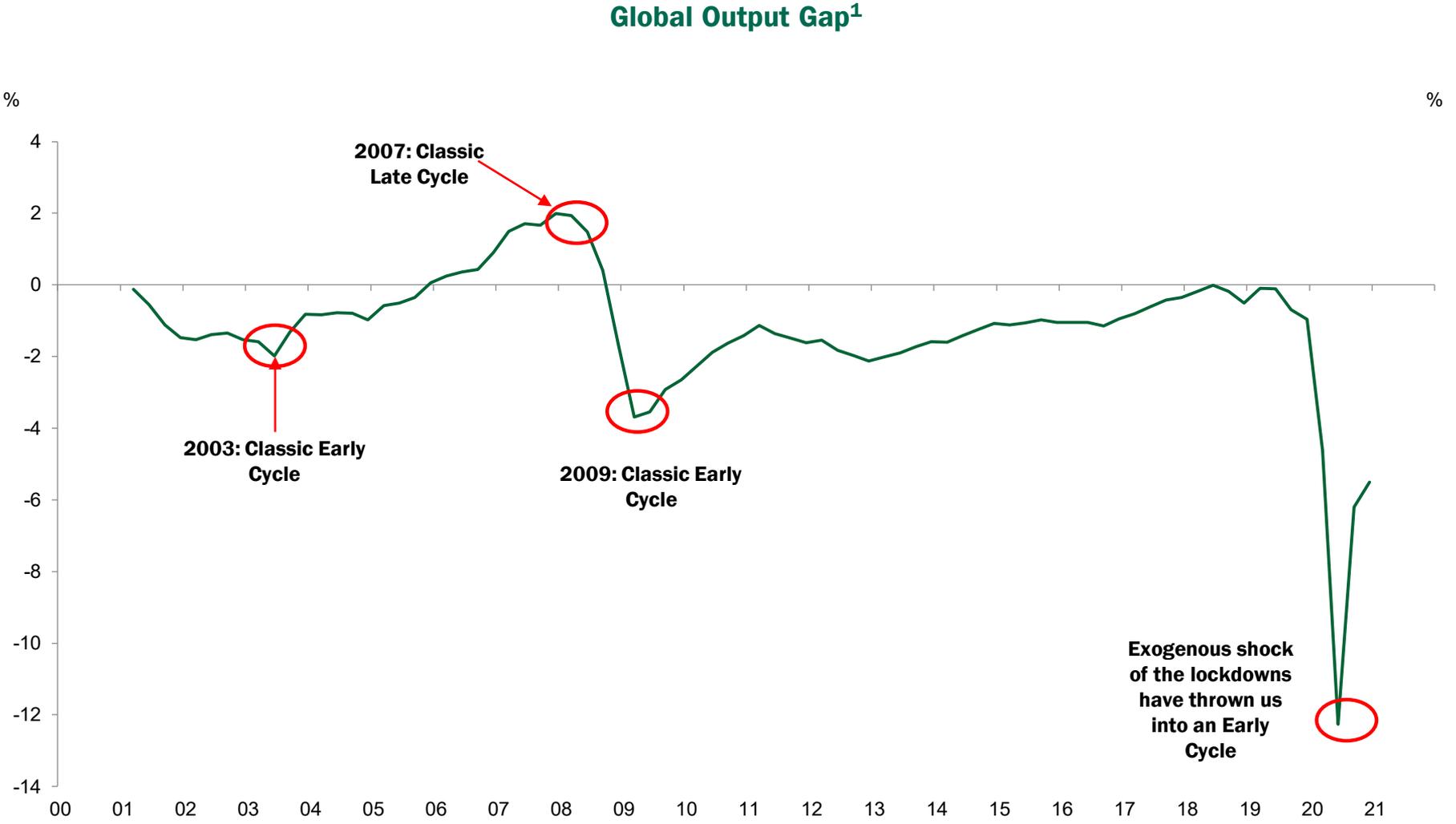
We do not expect fiscal austerity this time around

Yet unlike the last cycle, Government spending will be supportive



Source: ¹Macrobond, Bloomberg, PineBridge Investments Calculations as of 1 February 2021. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any views represent the opinion of the investment manager, are valid as of the date indicated, and are subject to change

The Covid crisis has thrown the global economy back into an early cycle dynamic



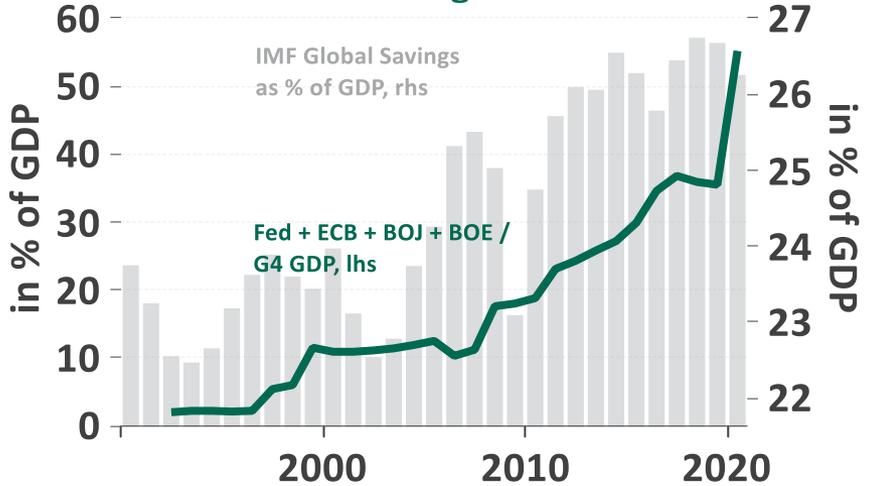
Source: Goldman Sachs, Macrobond, Bloomberg, PineBridge Investments Calculations as of 31 December 2020. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any views represent the opinion of the investment manager, are valid only as of PAGE 22 the date indicated, and are subject to change.



Post-crisis liquidity trap may get worse

Global Savings Glut and QE have flowed into Fixed Income and Private equity

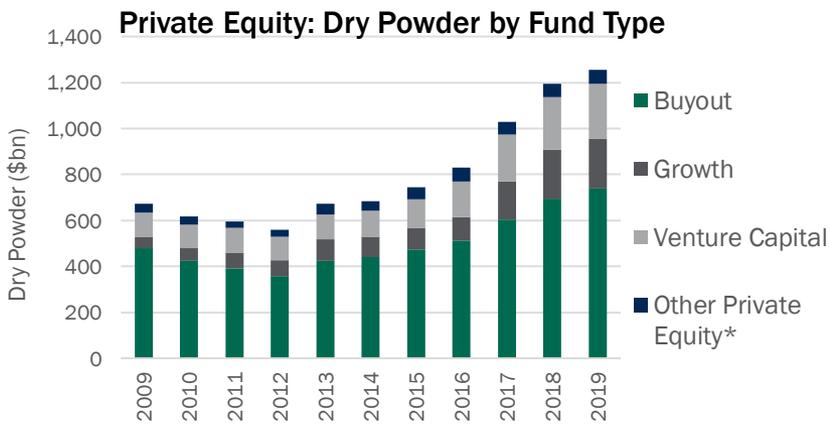
Global Savings Glut¹



Continuing Flows Into Fixed Income Have Weighed Down Term Premium²

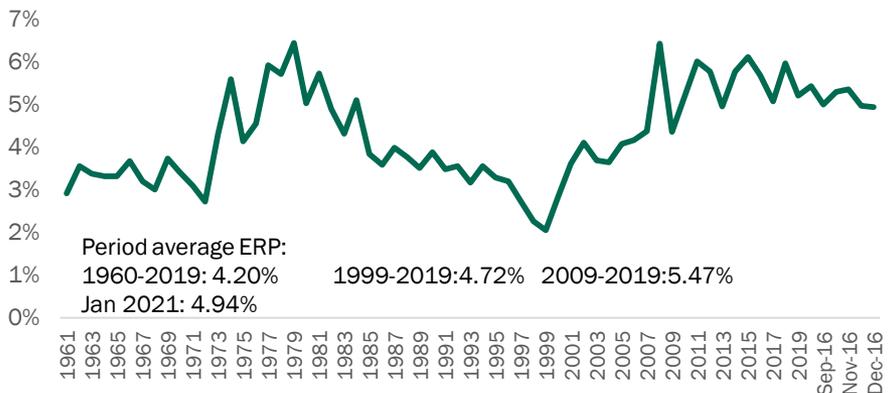


Record level of Dry Powder In Private Equity Suggests Crowding³



US Equity Risk Premium is on the high end⁴

US Equity Implied Premium: 1960- Jan 2021



¹Source: Trading Economics, ISI, IMF, World Bank, and Bloomberg; BOJ and ECB data are sourced from Trading Economics and translated at the prevailing FX rate. FED data is retrieved from ISI. For ECB data before 1999, ECB is assumed to grow its balanced sheet as an average of BOJ and FED. Gross savings are calculated as gross national income less total consumption, plus net transfers As of February 1 2021. ²Source: Bloomberg, Pinebridge Investment, February 1 2021. ³Source: Preqin. As of 30 September 2020. ⁴Source: Evercore, ISI; Aswath Damodaran, NYU Professor of Finance. As of 1 Feb. 2021 Any opinions, forecasts and forward-looking statements presented above are valid only as of the date indicated and are subject to change. For illustrative purposes only. We are not soliciting or recommending any action based on this material.

Intermediate Term Convictions

Productivity Basket

Reflects Rising Business Investment in Corporate-Focused Technology Sectors

Key Drivers:

- Rising global business investment activity intentions are reflected in corporate-focused technology sectors such as cloud computing, software as a service, and cyber security.
- While these concepts have existed for many years, we believe this has reached critical mass and are now prioritized in IT spending budgets to protect margins and counter disruption in several industries.
- Confirmation of this is reflected in the clear upward inflection in sales growth for these sub-sectors.
- While the longer-term impacts of Covid-19 are not certain, these companies are well placed to benefit from any increase in working from home. Cloud computing in particular should remain resilient.
- ESG has been trending positive over the last year. Software companies are setting carbon emission targets. Increased focus on using renewable energy when selecting data providers.

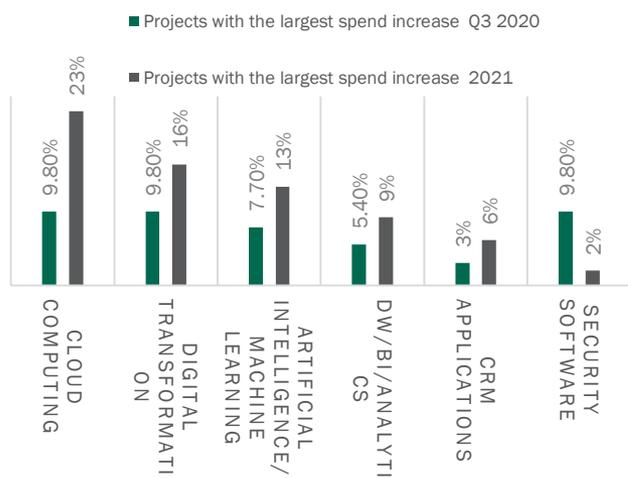
PineBridge Productivity Basket¹

Component	Weights
Automation & Robotics	20%
Cloud Computing	20%
Cyber Security	25%
Software As Service	10%
AI & IOT	15%
IT Services	10%

Revenue Breakdown in 2019¹

	Weights (%)
North America	39.4%
Europe	31.3%
Japan	19.4%
APAC ex-Japan	8.4%
Central & South America	1.0%
Middle East	0.5%

Expected IT Spending Growth by Sector to grow in 2021¹



Sustainalytics Rank²



UK Mid-Cap Equity

Valuations, post-Brexit certainty, and vaccine rollout key to UK outperformance

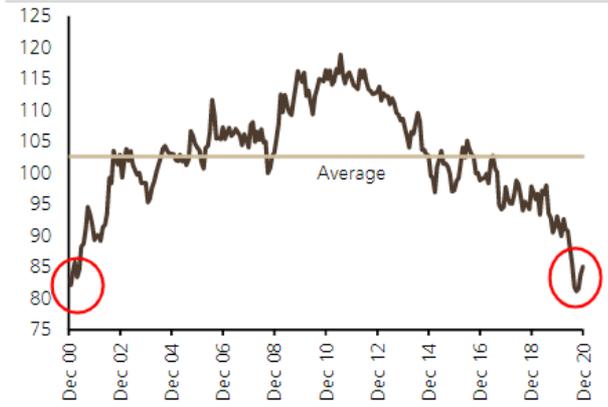
Key Drivers:

- UK has derated strongly since the 2016 Brexit vote and is currently trading at very cheap levels compared to global peers.
- Worst case “Brexit” deal has been averted which should lead to improved sentiment.
- Improved dividend payout ratios along with the vaccine roll out should be supportive.
- UK cyclicals still trade at a sizeable discount compared to European cyclicals and in general are cheap compared to its peers.
- Vaccine rollout, unprecedented fiscal and monetary support should help the UK economy recover.
- The UK is a global leader in ESG. ESG performance between the 3 pillars. Generally higher-risk for high cap, compared to small cap.

UK Equities are cheap relative to peers

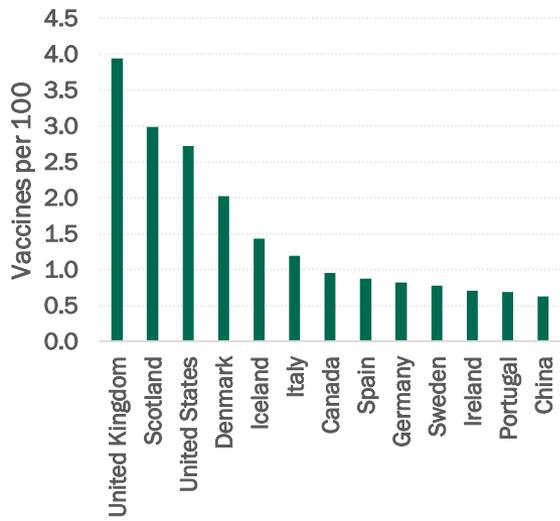


Trailing Book price Relative to Europe

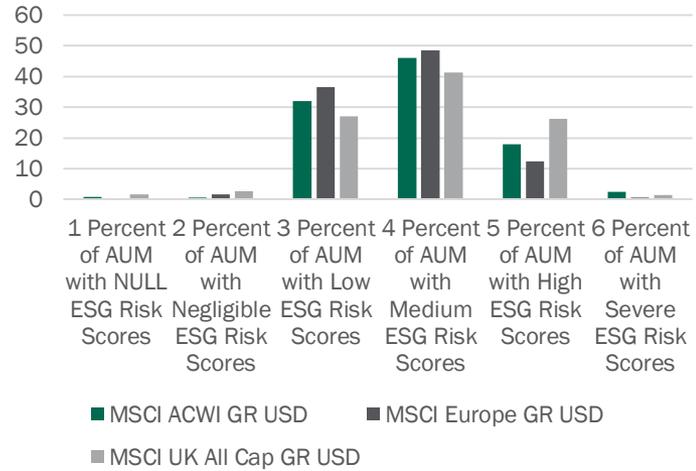


Source: MSCI, Thomson Datastream, UBS European Equity Strategy

UK is leading the Vaccine Rollout



Morningstar Current State ESG Risk Rating



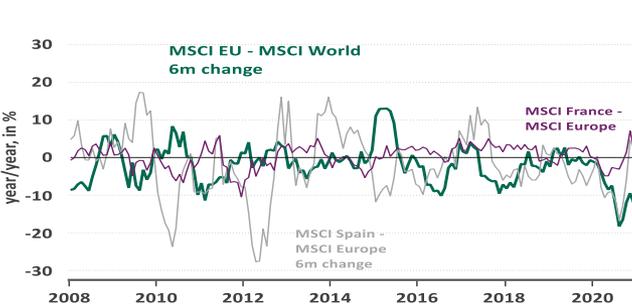
French and Spanish Equities

The Cyclical French and Spanish markets should outperform as growth improves

Key Drivers:

- Growth in Europe is on a positive upward trajectory thanks to their ability to manage the virus, ECB intervention, and furlough schemes which have been less damaging for employment.
- The approval of the EUR750bn “Next Generation EU” recovery fund sets a crucial precedent for fiscal union and allays concerns surrounding Italy’s debt problems. The focus is on investment.
- With Spain, we gain exposure to potential recovery in tourism and financials. France has a higher exposure to consumer discretionary and industrials which should be supported by early cycle recovery prospects.
- Spain has made meaningful changes to its environmental picture, to install renewable energy capacity every year for next 10 years and introduce ambitious draft laws to achieve net zero by 2050. France is similar to European Equity, mandatory reporting will increase going forward, some of which is mandated by reporting requirements by investors.

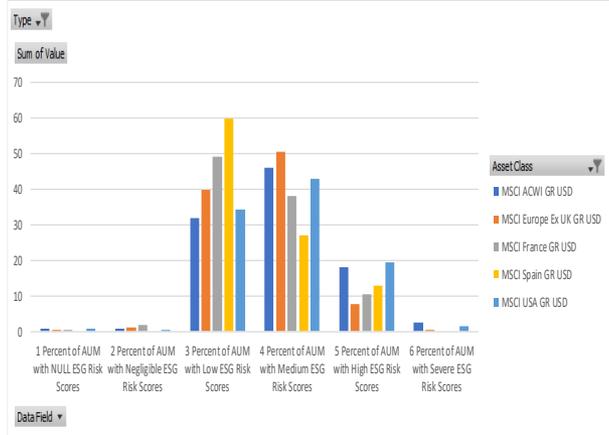
Spain and France tend to outperform when EU equities rally¹



Sector Breakdown of the Spanish and French equity markets highlights cyclical nature²



Morningstar Current State ESG Risk Rating³



Sustainalytics Rank⁴



Source: ¹Bloomberg, Macrobond, Pinebridge Investments, January 2021. ²Source: HSBC based on European Commission, Pinebridge Investments. ³Sustainalytics. As of 2 December 2020. ⁴Morningstar. As of 6 October 2020. Any views are the opinion of the investment manager and are subject to change. There can be no assurance that the target will be achieved. For illustrative purposes only. We are not soliciting or recommending any action based on this material.

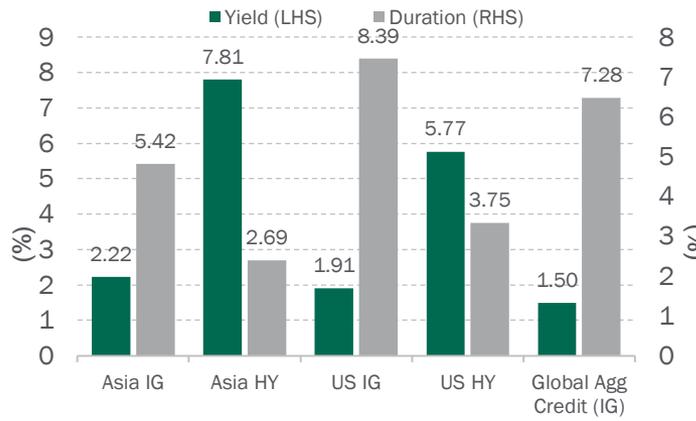
Asia Investment Grade Credit (USD)

Virus moving East to West means Asian assets will likely rebound

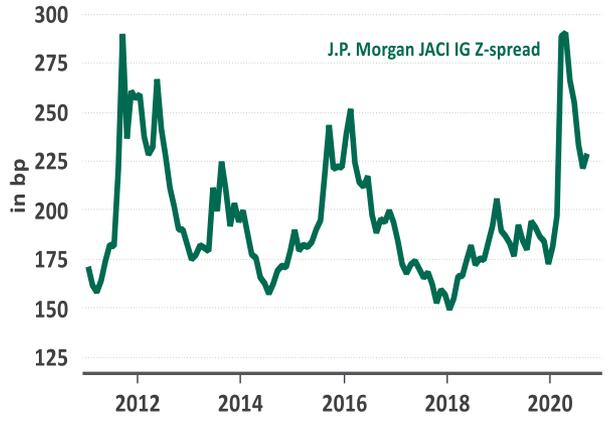
Key Drivers:

- Asian economies fundamentally less geared to the services sector than the West.
- Asia ahead of the curve in managing the virus. Governments have responded proactively and aggressively to mitigate the impact of the virus.
- Asian IG credit fundamentals will be more resilient. More of the names are government related entities.
- Valuations are very attractive, although less so than the US. But risk of fallen angels and interest rate risk is higher in the US.

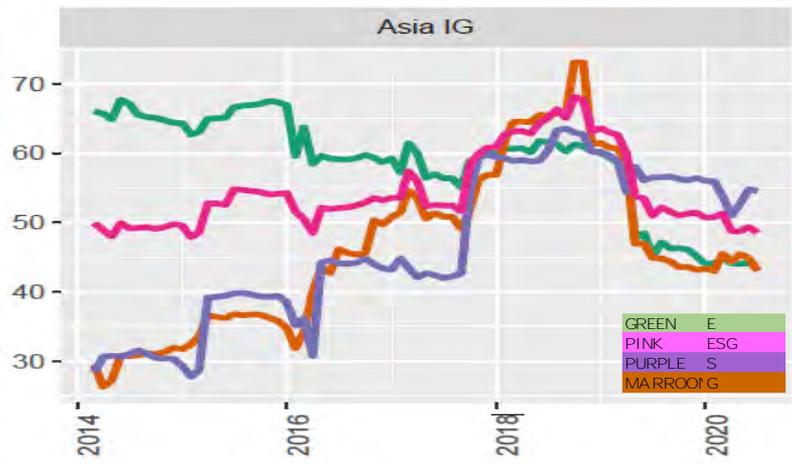
Net leverage remains low in Asia¹



Spike in Asia IG index spread over UST portrays market fears not fundamentals¹



Sustainalytics Rank²



Source: IMF, Bloomberg, Macrobond PineBridge Investments Calculations as of February 1 2021; ²Sustainalytics. As of 2 December 2020. For illustrative purposes only. We are not soliciting or recommending any action based on this material. Any views represent the opinion of the investment manager as of the date indicated, and are subject to change. ³Sustainalytics. As of 2 December 2020.



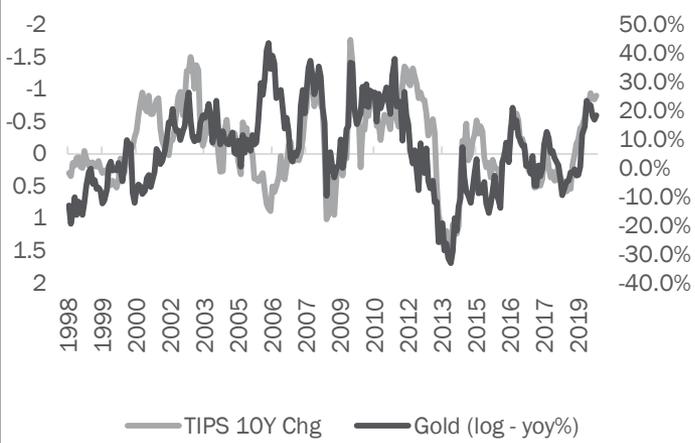
Gold

A hedge for negative real yields and equity risk

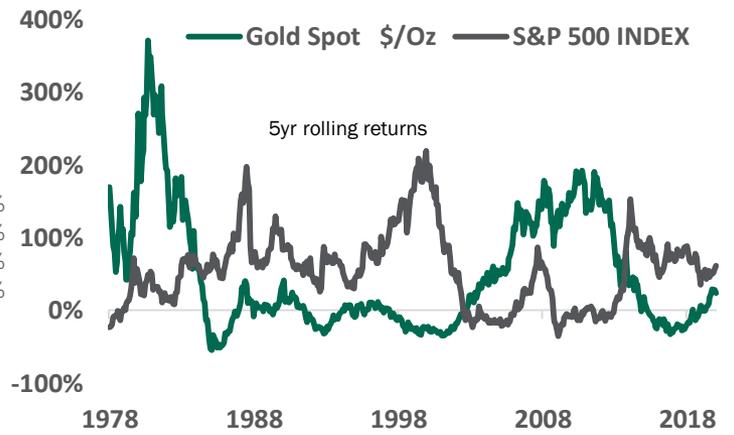
Key Drivers:

- Real yields is the single most important variable to explain changes in the price of gold. The relationship is inverse.
- Over the long run, gold serves a hedge for equities.
- But the effectiveness of gold as a hedge for equity risk is dependent on the cause of the selloff: deflationary v. inflationary.
- Inflationary shock (excess demand) is positive for gold; negative demand shock leads to initial underperformance in gold then when CBs reduce rates and real rates decline, then leads to a prolonged rally in gold prices.

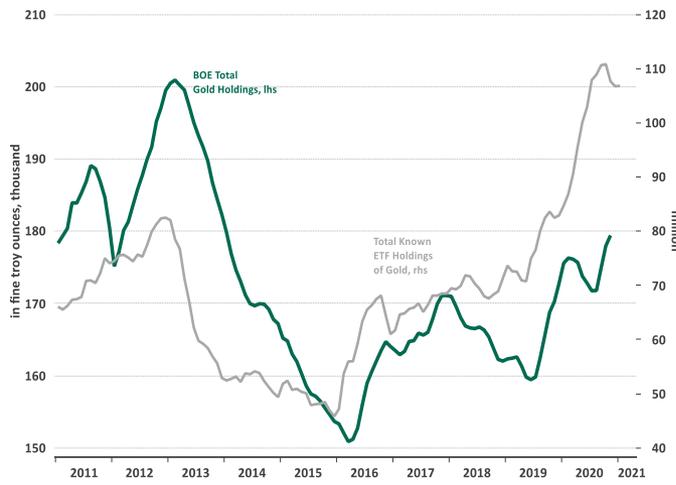
Lower real yields will be supportive for gold prices



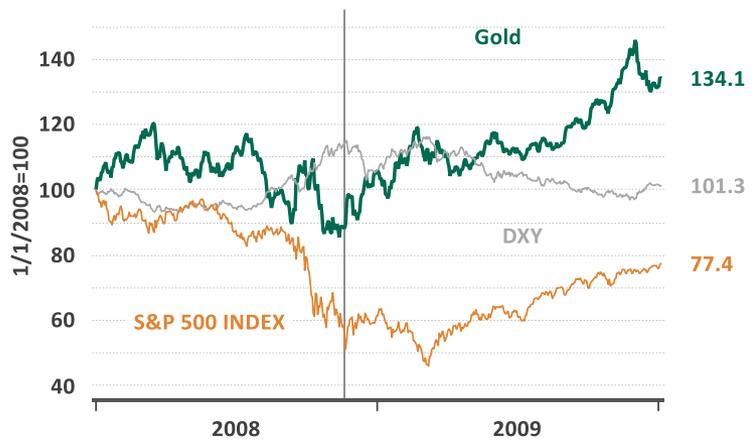
In the long run, gold returns are strongly inversely correlated to equities



Investor demand for Gold is rising



Gold also underperformed in 2008, until the Fed stepped in and removed liquidity constraints



Source: IMF, Bloomberg, Macrobond PineBridge Investments Calculations as of February 1 2021. Any views represent the opinion of the investment manager, are valid only as of the date indicated, and are subject to change.

Section V

Appendix & Disclosures

Responsible Investing

Industry Presence and ESG Recognition

Inaugural member, Advisory Council of the Green, Social and Sustainable Bond Principles

G20 Global Summit in Japan, **UN Expert Group** in New York, **IMF World Bank Annual Meetings** in Washington

Investment Week Nomination Best Thought Leadership on Sustainable Investing¹

Corporate Responsibility Steering Committee Oversight



Corporate Responsibility Steering Committee

- Diversity & Inclusion Committee
- ESG Investment Committee
- Company Responsibility Committee
- Stewardship Committee



As of 31 March 2020. For illustrative purposes only. ¹Nominated for Best Thought Leadership Paper on Sustainable Investing for Investment Week's 2019 Sustainable & ESG Investment Awards.

PineBridge Multi-Asset ESG Philosophy

Market Leading and Consistent with Firm

PineBridge believes an analytical approach that considers how companies are seeking to improve upon environmental, social, and governance (ESG) issues can be material to investment returns as well as risk mitigation over the medium to long term. In evaluating ESG issues, PineBridge recognizes that business models that improve upon their sustainability often create value, which should be rewarded. Change always matters to investment performance. Improving upon ESG matters more to society than a mere rejection of the status quo. We believe this enhances investment results and hastens change.

Multi Asset Team Philosophy



Like companies, asset classes that generate more sustainable cash flows create more economic benefit.

Asset classes respond to change at the margin, therefore ESG improvement matters at least as much, if not more so, than state of being for portfolios and society at large.



Companies respond more to owners than conscientious objectors.

While both parties can play a useful role, we believe engagement by owners is more effective in driving ESG improvement versus an exclusionary strategy.



ESG is assessed top down and bottom up, through both selection and engagement.

The engagement bar is raised for companies exhibiting higher ESG risks. In allocating to passive, allocators take on incremental engagement responsibility.

Global Disclosure Statement (page 1 of 2)

PineBridge Investments is a group of international companies that provides investment advice and markets asset management products and services to clients around the world. PineBridge Investments is a registered trademark proprietary to PineBridge Investments IP Holding Company Limited.

Readership: This document is intended solely for the addressee(s) and may not be redistributed without the prior permission of PineBridge Investments. Its content may be confidential, proprietary, and/or trade secret information. PineBridge Investments and its subsidiaries are not responsible for any unlawful distribution of this document to any third parties, in whole or in part.

Opinions: Any opinions expressed in this document represent the views of the manager, are valid only as of the date indicated, and are subject to change without notice. There can be no guarantee that any of the opinions expressed in this document or any underlying position will be maintained at the time of this presentation or thereafter. We are not soliciting or recommending any action based on this material.

Risk Warning: All investments involve risk, including possible loss of principal. If applicable, the offering document should be read for further details including the risk factors. Our investment management services relate to a variety of investments, each of which can fluctuate in value. The investment risks vary between different types of instruments. For example, for investments involving exposure to a currency other than that in which the portfolio is denominated, changes in the rate of exchange may cause the value of investments, and consequently the value of the portfolio, to go up or down. In the case of a higher volatility portfolio, the loss on realization or cancellation may be very high (including total loss of investment), as the value of such an investment may fall suddenly and substantially. In making an investment decision, prospective investors must rely on their own examination of the merits and risks involved.

Performance Notes: Past performance is not indicative of future results. There can be no assurance that any investment objective will be met. PineBridge Investments often uses benchmarks for the purpose of comparison of results. Benchmarks are used for illustrative purposes only, and any such references should not be understood to mean there would necessarily be a correlation between investment returns of any investment and any benchmark. Any referenced benchmark does not reflect fees and expenses associated with the active management of an investment. PineBridge Investments may, from time to time, show the efficacy of its strategies or communicate general industry views via modeling. Such methods are intended to show only an expected range of possible investment outcomes, and should not be viewed as a guide to future performance. There is no assurance that any returns can be achieved, that the strategy will be successful or profitable for any investor, or that any industry views will come to pass. Actual investors may experience different results.

Information is unaudited unless otherwise indicated, and any information from third-party sources is believed to be reliable, but PineBridge Investments cannot guarantee its accuracy or completeness.

This document and the information contained herein does not constitute and is not intended to constitute an offer of securities or provision of financial advice and accordingly should not be construed as such. The securities and any other products or

services referenced in this document may not be licensed in all jurisdictions, and unless otherwise indicated, no regulator or government authority has reviewed this document or the merits of the products and services referenced herein. This document and the information contained herein has been made available in accordance with the restrictions and/or limitations implemented by any applicable laws and regulations. This document is directed at and intended for institutional and qualified investors (as such term is defined in each jurisdiction in which the security is marketed). This document is provided on a confidential basis for informational purposes only and may not be reproduced in any form. Before acting on any information in this document, prospective investors should inform themselves of and observe all applicable laws, rules and regulations of any relevant jurisdictions and obtain independent advice if required. This document is for the use of the named addressee only and should not be given, forwarded or shown to any other person (other than employees, agents or consultants in connection with the addressee's consideration thereof).

Country Disclosures:

Australia: PineBridge Investments LLC is exempt from the requirement to hold an Australian financial services license under the Corporations Act 2001 (Cth) in respect of the financial services it provides to wholesale clients, and is not licensed to provide financial services to individual investors or retail clients. Nothing herein constitutes an offer or solicitation to anyone in or outside Australia where such offer or solicitation is not authorised or to whom it is unlawful. This information is not directed to any person to whom its publication or availability is restricted.

Brazil: PineBridge Investments is not accredited with the Brazilian Securities Commission - CVM to perform investment management services. The investment management services may not be publicly offered or sold to the public in Brazil. Documents relating to the investment management services as well as the information contained therein may not be supplied to the public in Brazil.

Chile: PineBridge Investments is not registered or licensed in Chile to provide managed account services and is not subject to the supervision of the Comisión para el Mercado Financiero de Chile ("CMF"). The managed account services may not be publicly offered or sold in Chile.

Columbia: This document does not have the purpose or the effect of initiating, directly or indirectly, the purchase of a product or the rendering of a service by PineBridge Investments ("investment adviser") to Colombian residents. The investment adviser's products and/or services may not be promoted or marketed in Colombia or to Colombian residents unless such promotion and marketing is made in compliance with decree 2555 of 2010 and other applicable rules and regulations related to the promotion of foreign financial and/or securities related products or services in Colombia. The investment adviser has not received authorisation of licensing from The Financial Superintendency of Colombia or any other governmental authority in Colombia to market or sell its financial products or services in Colombia. By receiving this document, each recipient resident in Colombia acknowledges and agrees that such recipient has contacted the investment adviser at its own initiative and not as a result of any promotion or publicity by the investment adviser or any of its representatives. Colombian residents acknowledge and represent that (1) the receipt of this presentation does not constitute a solicitation from

Global Disclosure Statement (page 2 of 2)

the investment adviser for its financial products and/or services, and (2) they are not receiving from the investment adviser any direct or indirect promotion or marketing of financial products and/or services. Marketing and offering of products and/or services of a foreign financial [or securities related] entity represented in Colombia.

Promoción y oferta de los negocios y servicios de la entidad del mercado de valores del exterior [o financiera, según sea el caso] representada en Colombia.

Dubai: PineBridge Investments Europe Limited is regulated by the Dubai Financial Services Authority as a Representative Office.

Germany: PineBridge Investments Deutschland GmbH is authorised and regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin).

Hong Kong: The issuer of this document is PineBridge Investments Asia Limited, a company incorporated in Bermuda with limited liability, licensed and regulated by the Securities and Futures Commission (SFC). This document has not been reviewed by the SFC.

Ireland: Approved by PineBridge Investments Ireland Limited. This entity is authorised and regulated by the Central Bank of Ireland.

Israel: PineBridge Investments is neither licensed nor insured under the Israeli Investment Advice Law.

Japan: This document is not, and under no circumstances is to be considered as, a public offering of securities in Japan. No registration pursuant to Article 4 paragraph 1 of Japan's Financial Instruments and Exchange Act ("FIEA") has been or will be made with respect to any solicitation of applications for acquisition of interests of any vehicle or any account that may be undertaken, on the grounds that any such solicitation would constitute a "solicitation for qualified institutional investors" as set forth in Article 23-13, paragraph 1 of the FIEA. In Japan, this document is directed at and intended for qualified institutional investors (as such term is defined in Article 2, paragraph 3, item 1 of the FIEA; "QIIs"). If any offering is to be made, that would be made on the condition that each investor enters into an agreement whereby the investor covenants not to transfer its interests (i) to persons other than QIIs, or (ii) without entering into an agreement whereby the transferee covenants not to transfer its interests to persons other than QIIs.

Kuwait: The offering of any security in any vehicle has not been approved or licensed by the Kuwait Capital Markets Authority or any other relevant licensing authorities in the State of Kuwait, and accordingly does not constitute a public offer in the State of Kuwait in accordance with Law no. 7 for 2010 regarding the Establishment of the Capital Markets Authority and the Regulating Securities Activities ("CMA Law"). This document is strictly private and confidential and is being issued to a limited number of professional investors: A) who meet the criteria of a Professional Client by Nature as defined in Article 2-6 of Module 8 of the Executive Regulations No. 72 of 2015 of the CMA Law; B) upon their request and confirmation that they understand that the securities have not been approved or licensed by or registered with the Kuwait Capital Markets Authority or any other relevant licensing authorities or governmental agencies in the State of Kuwait; and must not be provided to any person other than the original recipient, and may not be reproduced or used for any other purposes whatsoever.

Malaysia: PineBridge Investments Malaysia Sdn Bhd is licensed and regulated by Securities Commission of Malaysia (SC). This material is not reviewed or endorsed by the SC.

Peru: Specifically, the Interests will not be subject to a public offering in Peru. The Interests described herein have not been and will not be approved by or registered with the Peruvian Superintendency of Capital Markets (Superintendencia del Mercado de Valores, or the "SMV") or the Lima Stock Exchange (Bolsa de Valores de Lima). Accordingly, the Interests may not be offered or sold in Peru except, among others, if such offering is considered a private offer under the securities laws and regulations of Peru. The Interests cannot be offered or sold in Peru or in any other jurisdiction except in compliance with the securities laws thereof. In making an investment decision, institutional investors (as defined by Peruvian law) must rely on their own examination of the terms of the offering of the Interests to determine their ability to invest in the Interests. All content in this document is for information or general use only. The information contained in this document is referential and may not be construed as an offer, invitation or recommendation, nor should be taken as a basis to take (or stop taking) any decision. This document has been prepared on the basis of public information that is subject to change. This information may not be construed as services provided by PineBridge Investments within Peru without having the corresponding banking or similar license according to the applicable regulation.

Singapore: PineBridge Investments Singapore Limited is licensed and regulated by the Monetary Authority of Singapore (MAS). In Singapore, this material may not be suitable to a retail investor and is not reviewed or endorsed by the MAS.

Switzerland: In Switzerland, PineBridge Investments Switzerland GmbH classes this communication as a financial promotion and is solely intended for professional investors only.

Taiwan: PineBridge Investments Management Taiwan Ltd. Is licensed and regulated by Securities and Futures Bureau of Taiwan (SFB). In Taiwan, this material may not be suitable to investors and is not reviewed or endorsed by the SFB.

United Kingdom: PineBridge Investments Europe Limited is authorised and regulated by the Financial Conduct Authority (FCA). In the UK this communication is a financial promotion solely intended for professional clients as defined in the FCA Handbook and has been approved by PineBridge Investments Europe Limited. Should you like to request a different classification, please contact your PineBridge representative.

Uruguay: The sale of the securities qualifies as a private placement pursuant to section 2 of Uruguayan law 18.627. The issuer represents and agrees that it has not offered or sold, and will not offer or sell, any securities to the public in Uruguay, except in circumstances which do not constitute a public offering or distribution under Uruguayan laws and regulations. The securities are not and will not be registered with the Central Bank of Uruguay to be publicly offered in Uruguay. The securities correspond to investment funds that are not investment funds regulated by Uruguayan law 16,774 dated 27 September 1996, as amended.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: PineBridge Benchmark Change

ACTION: X

DATE: March 18-19, 2021

INFORMATION: _____

BACKGROUND

PineBridge was hired by the Alaska Retirement Management Board (ARMB) in 2018 to invest in a multi-asset global tactical asset allocation strategy called Global Dynamic Asset Allocation.

The approach is based on PineBridge's capital market line (CML) and calibrating portfolio risk based on their assessment of the slope of the capital market line, asset class risk and return positioning relative to the CML, and intermediate-term performance conviction.

The portfolio is actively managed and currently benchmarked against a 60% MSCI ACWI and 40% Bloomberg Barclays Global Treasury Total Return Index. The objective of the portfolio is to achieve a CPI + 5% return and exceed the blended benchmark by 200 basis points net of fees over a market cycle. Historically, realized tracking error has been in the range of 400 to 500 basis points.

STATUS

Benchmark Constituents

The PineBridge benchmark constituents are different than ARMB's Opportunistic asset class benchmark. Using the same benchmark constituents for the PineBridge Global Dynamic Asset Allocation strategy ensures the underlying portfolios are calibrated toward the same asset class specifications. Accordingly, the benchmark should be revised to reflect the MSCI ACWI IMI Net as the equity component and the Bloomberg Barclays U.S. Aggregate as the bond component.

Benchmark Weights

For Fiscal Year 2021, the PERS, TRS, and JRS risk/return profile of its asset allocation is modestly in excess of a 70% equity/30% bond portfolio.

	FY21 PERS	60/40	70/30
Expected Return	7.13%	6.27%	6.65%
Standard Deviation	13.55%	10.85%	12.65%

PineBridge is comfortable increasing the risk posture from 60% equity/40% bonds to 70% equity/30% bonds and staff expects this to be better aligned with the overall objectives of the ARMB's portfolio.

Investment Guidelines

The PineBridge contractual investment guidelines had previously been adopted by formal ARMB Resolution 2019-02. Staff recommends handling individual manager guidelines at a lower level than this. As such, staff is recommending changing the overall benchmark for PineBridge by board action instead of resolution and is also recommending that the past resolution be repealed and not replaced.

RECOMMENDATIONS

1. The ARMB authorize staff to make the necessary changes to the PineBridge investment guidelines to change the blended benchmark to 70% MSCI ACWI IMI and 30% Bloomberg Barclays US Aggregate index.
2. The ARMB repeal Resolution 2019-02 relating to the Global Dynamic Asset Allocation Investment Guidelines.

Attachment: PineBridge Global Dynamic Asset Allocation Investment Guideline Redline

GLOBAL DYNAMIC ASSET ALLOCATION (“GDAA”)
INVESTMENT GUIDELINES

A. Investment Objective

The investment objective of the GDAA Portfolio (“Portfolio”) is to outperform the benchmark net of fees by 200 bps or more, and achieve a total return of US CPI Urban Consumers Less Food & Energy Index + 5%, over a full market cycle. An additional objective is to provide fundamental downside protection, specifically in stressed environments that result in protracted bear markets.

The results will be achieved primarily through passive management of market exposure using dynamic asset allocation. Portfolio risk will be managed dynamically, yet is expected to average the Benchmark risk over a full market cycle. It is understood such results are an objective of the Portfolio and cannot be guaranteed.

B. Benchmark and Permissible Ranges

The benchmark for the Portfolio is constructed as follows:

Index	Benchmark
MSCI All Country World IMI Daily Total Return Net Index	760%
Bloomberg Barclays U.S. Aggregate Global Treasury Total Return Index	340%

While portfolio implementation is expected to be passive in terms of security selection, portfolio asset class weights are expected to deviate significantly from these benchmark weights. Portfolio exposures are broadly expected to be in the following ranges:

Asset Class	Permissible Ranges	
	Minimum	Maximum
Equity Asset Classes	20%	85%
Fixed Income Asset Classes	20%	85%
Liquid Alternatives *	0%	15%

* Liquid Alternatives include commodities and any future liquid asset classes added to PineBridge’s research coverage universe (as defined by asset classes covered in PineBridge’s unabridged Capital Market Line document) that do not fall in the equity or fixed income categories as defined by the nature of the security instrument rather than how PineBridge may assign the asset class for portfolio modeling and construction.

PineBridge will request permission from Alaska Retirement Management Board (“ARMB”) staff before investing outside of these ranges.

C. Investable Securities

The list of asset classes in Exhibit A of these guidelines reflects the current composition of the Capital Market Line asset class constituents maintained by PineBridge. As such, liquid asset classes in this list reflect potential ARMB portfolio investments over time. The asset class list in Exhibit A is subject to change over time as PineBridge evolves the asset class structure with the market opportunity set.

Assets of the Portfolio generally shall be allocated among cash instruments, exchange trade funds (ETFs), derivatives, and funds/trusts/portfolios managed by PineBridge Investments, LLC and its affiliates (“PineBridge”). Allocations made to funds/trusts/portfolios managed by PineBridge shall be managed without a management fee however, shall be subject to normal operating costs and expenses (e.g. administrator and custodian fees and expenses).

The assets of the Portfolio and the transactions that may be entered into by the Portfolio may include long and short positions in U.S. and non-U.S. equities and equity-related instruments, fixed income and other debt-

related instruments; securitization products, such as MBS, CMBS, ABS, and CLOs; derivatives, including options, warrants, futures and other commodities, currencies, currency forwards, and other over-the-counter derivative instruments such as total return swaps; repurchase and reverse repurchase agreements; hybrid securities, including preferred stocks and convertible bonds, convertible preferred stocks, bonds or preferred stocks with warrants, contingent convertibles (CoCo's), and zero or low coupon convertibles; real estate related securities; and Cash and Cash Equivalents (as defined below).

The use of derivatives within the Portfolio is expected to be for replicating market exposures, efficient rebalancing of the asset allocation, and hedging purposes. The net long exposure of the Portfolio will be maintained between 40% and 100%; the gross long exposure may increase to 180% under certain circumstances, excluding currency hedging. The Portfolio may hold "Cash and Cash Equivalents," which include cash, short-term investment funds managed by the custodian and money-market instruments, which include (i) U.S. Government securities, (ii) obligations issued or guaranteed by U.S. and foreign corporations payable in U.S. dollars (e.g., commercial paper) and (iii) obligations of domestic banks, which include certificates of deposit, time deposits, unsecured bank promissory notes and bankers' acceptances.

Gross long exposure is defined as:

Base market value of all long cash equity and fixed income market positions	+
Absolute base market value of all underlying long exposure of equity/fixed income/commodity derivative positions	+
Absolute base market of all underlying short exposure of equity/fixed income/commodity derivative positions	+
Total gross long (\$)	=
Total market value of the portfolio (NAV)	/
Gross long exposure (%)	=

Net long exposure is defined as:

Base market value of all long cash equity and fixed income market positions	+
Absolute base market value of all underlying long exposure of equity/fixed income/commodity derivative positions	+
Absolute base market of all underlying short exposure of equity/fixed income/commodity derivative positions	-
Total net long (\$)	=
Total market value of the portfolio (NAV)	/
Net long exposure (%)	=

For both gross long and net long calculations, Cash & Cash Equivalents asset classes (including currency related derivatives) are excluded from the calculation of the numerator. However, Cash & Cash Equivalents asset classes are included in the calculation of the denominator.

D. Investment Restrictions

1. Manager has full discretion on security selection. In the event the aggregate total of any equity security held by the ARMB exceeds five percent (5%) of total shares outstanding, the ARMB will notify portfolio

managers who will act to sell the security in a commercially reasonable manner until the aggregate is below five percent (5%). The ARMB will be responsible for monitoring its aggregate position size and notifying Manager if action needs to be taken.

2. No more than ten percent of the voting stock of any corporation may be acquired or held.
3. The Portfolio will not purchase the securities of a company for the purpose of acquiring control or management thereof.
4. Certificates of deposit must be issued by domestic United States banks or trust companies which are members of the Federal Deposit Insurance Corporation, and are readily saleable in a recognized secondary market for such instruments.
5. Bankers' acceptances must have been drawn on and accepted by United States banks which have capital and surplus of at least \$200 million each.
6. The issuing bank for negotiable certificates of deposit and bankers acceptances must have total assets in excess of \$5 billion.
7. All futures and options positions must be reported to the client each month. The report must show both the nominal position and the "economic impact" of all derivative positions.
8. Repurchase agreements must be collateralized only by U.S. Treasury obligations, including bills, notes, and bonds, and only when the collateral carries a market value equal to or greater than 102% of the amount of the repurchase agreements, and only when the custodial bank appointed by retirement funds will take custody of the collateral.
9. The Portfolio may not hold more than 5% of the portfolio's assets in any one corporate debt issuer.
10. The Portfolio may not purchase more than 10% of the currently outstanding par value of any bond issue.
11. Internal cross trading is permitted but only in accordance with requirements under: (1) 29 U.S.C. §1108(b)(19); (2) 29 C.F.R. §2550.408b-19; and (3) 26 U.S.C. §4975(d)(22).
12. Futures and options contracts must be traded on an exchange. With respect to OTC derivatives, the period of the contract may not exceed twelve months and must be transacted with a counterparty authorized by PineBridge's Counterparty Approval Committee with an investment grade issuer rating by S&P, Moody's or Fitch. In the event that, after such investment is made, the counterparty fails to meet the minimum credit issuer rating requirement, the investment manager shall take appropriate measures within six months.
13. The Portfolio does not gain leverage through borrowing.
14. The Portfolio may not purchase securities on margin.
15. The Portfolio may not short individual stocks or bonds.
16. PineBridge is not permitted to lend or pledge securities in the account, unless it is part of an option strategy, such as a covered call. However, the Portfolio may participate in ARMB's securities lending program.
17. Short positions shall be held against long exposures at the asset class level. The resulting net long asset class exposure will be at least 0%.
18. The Portfolio will not invest in illiquid asset classes, such as Private Equity.

19. There shall be no investment in private placements, except Rule 144A securities, Regulation S securities, and commingled funds and trusts managed by PineBridge.
20. The Portfolio may not invest in securities originated by PineBridge with the exception of PineBridge managed comingled funds/trusts.
21. The Portfolio will not invest in certain statutorily specified types of companies doing significant business in Iran. The Alaska Retirement Management Board provided the initial restricted list and will notify PineBridge of any amendments to the universe.

E. Brokerage and Commissions

In carrying out its functions, a manager will use its best efforts to obtain prompt execution of orders at the most favorable prices reasonably obtainable, and in doing so, will consider a number of factors, including, without limitation, the overall direct net economic result to the ARMB (including commissions, which may not be the lowest available but which ordinarily will not be higher than the generally prevailing competitive range), the financial strength and stability of the broker, the efficiency with which the transaction is effected, the ability to effect the transaction at all where a large block is involved, the availability of the broker to stand ready to execute possible difficult transactions in the future and other matters involved in the receipt of “brokerage and research services” as defined in and in compliance with Section 28(e) of the Securities Exchange Act of 1934, as amended, and regulations thereunder.

If the manager determines execution only transactions do not result in the greatest net benefit to ARMB considering the factors described in this section E, the manager is encouraged to execute transactions with a brokerage firm participating in a commission recapture program with the ARMB.

Exhibit A

PineBridge Asset Class Structure

Multi Asset Coverage Universe

<u>Equities</u>	<u>Fixed Income</u>	<u>Alternatives</u>
US Equity	3M US Tbill	Commodity
Canadian Equity	3M Canadian Tbill	Real Estate *
UK Equity	3M Mexican Tbill	Hedge Fund of Funds
Japanese Equity	3M German Tbill	Private Equity
Australian Equity	3M UK Tbill	Private Credit
Singaporean Equity	3M Japanese Tbill	Listed Infrastructure *
International Small Cap	3M Australian Tbill	Private Infrastructure
EM Equity	3M Singapore Tbill	US Timber
EM Asian Equity	US Govt Bond	Listed Private Equity *
South Korean Equity	Canadian Govt Bond	
Taiwanese Equity	Mexican Govt Bond	<u>Currencies</u>
Indian Equity	German Govt Bond	USD
Indonesian Equity	UK Govt Bond	CAD
EM EMEA Equity	Japanese Govt Bond	GBP
Russian Equity	Australian Govt Bond	CHF
Hungarian Equity	Singapore Govt Bond	JPY
EM LatAm Equity	US TIPS	AUD
Brazilian Equity	US Municipal	SGD
Mexican Equity	US Intermediant Credit	EME
Peruvian Equity	US Long Credit	MXN
US Equity Value	US High Yield	EMD
US Equity Financials	US CLO AAA	
US Equity Large Broad	US Bank Loans	
US Equity Large Growth	MBS	
US Equity Large Value	CMBS	
US Equity Mid Broad	ABS	
US Equity Mid Growth	Asian Credit	
US Equity Mid Value	CoCo Bond	
US Equity Small Broad	EM Local Currency Debt	
US Equity Small Growth	EM Sovereign	
US Equity Small Value	EM Corporate	
German Equity	EM Corporate IG	
French Equity	EM Corporate HY	
Italian Equity	EM Sovereign IG	
Spanish Equity	EM Sovereign HY	
Swiss Equity	Brazilian Local Currency	
Dutch Equity	Peruvian Local Currency	
Productivity Basket	Argentinian Hard Currency	
Productivity Basket - AI & IOT	Indonesian Local Currency	
European Financials	US CLO AA	
Productivity Basket - Cloud	US CLO A	
Productivity Basket - Cyber	US CLO IG	
Productivity Basket - Big	Asian Credit HY	
Productivity Basket - SaaS	Asian Credit IG	
Productivity Basket - IT		
European Small Cap Equity		

* Investments in REITS and other listed alternatives should be included in "Equity Asset Classes" for purposes of determining Permissible Ranges in Section B.

2021 Capital Markets Assumptions

March 18, 2021

Alaska Retirement Management Board

Paul Erlendson

Fund Sponsor Consulting

Jay Kloepfer

Capital Markets Research

Steven Center, CFA

Fund Sponsor Consulting

Adam Lozinski, CFA

Capital Markets Research

Agenda

- **Process overview**
- **Why does Callan create capital markets projections?**
- **Current market conditions**
- **2021 expectations**
 - Economic outlook
 - Asset class outlook
 - *Equity*
 - *Fixed income*
 - *Alternative investments*
 - Forecast parameters
 - *Returns*
 - *Risk*
 - *Correlation*
- **Detailed 2021 projections and resulting ARMB portfolio returns**

Callan

Process Overview

Why Make Capital Markets Projections?

Guiding objectives and process

Cornerstone of a prudent process is a long-term strategic investment plan

- Capital markets projections are key elements — set reasonable return and risk expectations for the appropriate time horizon
- Projections represent our best thinking regarding the long-term (10-year) outlook, recognizing our median projections represent the midpoint of a range, rather than a specific number
- Develop results that are readily defensible both for individual asset classes and for total portfolios
- Be conscious of the level of change suggested in strategic allocations for long-term investors: DB plan sponsors, foundations, endowments, trusts, DC participants, families, and individuals
- Reflect common sense and recent market developments, within reason

Callan's forecasts are informed by current market conditions, but are not built directly from them

- Balance recent, immediate performance and valuation against long-term equilibrium expectations

How Are Capital Markets Projections Constructed?

Guiding objectives and process

Underlying beliefs guide the development of the projections:

- An initial bias toward long-run averages
- A conservative bias
- An awareness of risk premiums
- A presumption that markets are ultimately clear and rational

Reflect our beliefs that long-term equilibrium relationships between the capital markets and lasting trends in global economic growth are key drivers to setting capital markets expectations

Long-term compensated risk premiums represent “beta”—exposure to each broad market, whether traditional or “exotic,” with limited dependence on successful realization of alpha

The projection process is built around several key building blocks:

- Advanced modeling at the individual asset class level (e.g., a detailed bond model, an equity model)
- A path for interest rates and inflation
- A cohesive economic outlook
- A framework that encompasses Callan beliefs about the long-term operation and efficiencies of the capital markets

How Are Capital Markets Projections Constructed?

Projections are 10-year forward-looking, representing a medium to long-term planning horizon:

- Differs from the actuarial assumptions, which tend to reflect longer-term horizons of 30–40 years

Projections consist of return and two measures that contribute to portfolio volatility: standard deviation and correlation

Cover most broad asset classes and inflation

Broad U.S. equity

- Large cap
- Smid cap

Global ex-U.S. equity

- Developed market
- Emerging market

U.S. fixed income

- Short duration
- Core U.S. fixed
- TIPS
- High yield
- Long duration (government, credit, and government / credit)

Global ex-U.S. fixed income

Real estate

Alternative investments: private equity, hedge funds, private debt, private infrastructure

Cash

Inflation

How Does the Process Work?

For internal consumption: how the sausage is made

Start in summer of 2020

- CMR group, input from asset class specialists, consultants, management
 - Articulate goals for the update
 - Purpose of the projections, impact of changes on investor behavior, comparison to forecasts around the industry
 - What has changed in the capital markets in one year to warrant revision to longer-term expectations?
- Agreement on inflation, path to future interest rates, targets for segments of the fixed income market
 - Bond model to test scenarios and develop range of expectations
- Equity – real returns, risk premia, relation to fixed income expectations, change in valuation (if compelling)
 - Model to incorporate income, appreciation, any valuation change
- Set path for 2021
 - Lower fixed income expectations after arrival of the pandemic, Fed return to zero interest rate policy, stimulus, recession
 - Revisit equity expectations – equity risk premium over lower fixed income expectations
 - Refine and confirm suggested advantages of diversification benefit
- Test and tune expectations for reasonable asset mixes
 - Impose long-term beliefs and practical implementation
- Release projections and present to Callan clients January 14, 2021

2021–2030 Callan Capital Markets Assumptions

Asset Class	Index	Projected Return			Projected Risk	Projected Yield
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	
Equities						
Broad U.S. Equity	Russell 3000	8.00%	6.60%	4.60%	17.95%	1.95%
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.50%	17.70%	2.00%
Smid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.70%	21.30%	1.75%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.80%	20.70%	2.80%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.50%	19.90%	3.00%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.90%	25.15%	2.35%
Fixed Income						
Short Duration Gov't/Credit	Bloomberg Barclays 1-3 Yr Gov / Credit	1.50%	1.50%	-0.50%	2.00%	1.55%
Core U.S. Fixed	Bloomberg Barclays Aggregate	1.80%	1.75%	-0.25%	3.75%	2.50%
Long Government	Bloomberg Barclays Long Government	1.35%	0.60%	-1.40%	12.50%	3.00%
Long Credit	Bloomberg Barclays Long Credit	2.95%	2.45%	0.45%	10.50%	4.65%
Long Government/Credit	Bloomberg Barclays Long Gov / Credit	2.30%	1.80%	-0.20%	10.35%	4.00%
TIPS	Bloomberg Barclays TIPS	1.80%	1.70%	-0.30%	5.05%	2.35%
High Yield	Bloomberg Barclays High Yield	4.85%	4.35%	2.35%	10.75%	6.70%
Global ex-U.S. Fixed	Bloomberg Barclays Global Agg xUSD	1.15%	0.75%	-1.25%	9.20%	1.80%
Emerging Market Sovereign Debt	EMBI Global Diversified	3.90%	3.50%	1.50%	9.50%	5.95%
Alternatives						
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.75%	14.10%	4.40%
Private Infrastructure	MSCI Global Infra / FTSE Dev Core 50/50	7.00%	6.00%	4.00%	15.45%	4.60%
Private Equity	Cambridge Private Equity	11.50%	8.00%	6.00%	27.80%	0.00%
Private Credit	n/a	7.15%	6.25%	4.25%	14.60%	6.25%
Hedge Funds	Callan Hedge FOF Database	4.25%	4.00%	2.00%	8.00%	0.00%
Commodities	Bloomberg Commodity	3.80%	2.25%	0.25%	18.00%	2.00%
Cash Equivalents	90-Day T-Bill	1.00%	1.00%	-1.00%	0.90%	1.00%
Inflation	CPI-U		2.00%		1.50%	

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Callan

Current Market Conditions

Setting Capital Markets Expectations in an Uncertain Environment

One challenge to creating long-term forecasts is a shifting market environment.

- Where do you start?
 - Time horizon?
 - Does valuation matter?
 - What interest rate?
 - A downturn in the economy and cycles in the capital markets are fully expected over a 10-year cycle
 - Discipline in the face of uncertainty is difficult
- Arbitrary impact of plan year end dates on sponsor's results. Your funded status would look a lot different if your plan year ends on 6/30 or 9/30 rather than 12/31/20.
- Interest rate volatility wreaks havoc with LDI glidepaths

Market volatility since February 2020 is important, but we question how much it should impact a 10-year outlook used to guide strategic investment policy.

- Equity market bottomed in March, then surged through most of the second, third, and fourth quarters
- Fed cut rates to zero immediately and has no short-term plans to even think about raising rates
- Over-reliance on data at a specific starting date assigns outsized impact of current valuations on a 10-year forecast, but...
- Long-term forecast should not be moving month to month; suggests a level of precision and market timing that is not practical
- One can argue that we have pulled future returns forward from the next couple of years for both stocks and bonds in 2020

Rhetoric aside, we believe this time the shorter-term changes in the capital markets, particularly the bond market, have indeed been deep enough to change our outlook.

Stunning Recovery in Global Equity Markets in 3Q20

V-shaped equity rebound, ahead of the global economy

Global equity continued the rally in 4Q after March market bottom.

- S&P -33.5% from peak (02/19/20) to low on 3/23/20
- Rebound since March lifted the S&P 500 by 70% through December! However, the strong recovery was concentrated in a few stocks – mega cap, IT.
- Fed cut rates to zero, commenced QE, instituted multiple facilities to backstop money markets, credit markets, and economy
 - *Fed expects to get paid back*
 - *Further fiscal stimulus added at year-end*
- Economic recovery will be uncertain in 2021. Release of vaccines a huge positive development, but distribution challenges may keep widespread inoculation from being achieved until mid-year. As COVID-19 infections surge anew, re-openings may be reversed in many states and localities.

Returns for Periods ended 12/31/20

	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	14.68	20.89	15.43	13.79	9.67
S&P 500	12.15	18.40	15.22	13.88	9.56
Russell 2000	31.37	19.96	13.26	11.20	9.05
Global ex-U.S. Equity					
MSCI World ex USA	15.85	7.59	7.64	5.19	5.17
MSCI Emerging Markets	19.70	18.31	12.81	3.63	--
MSCI ACWI ex USA Small Cap	18.56	14.24	9.37	5.95	6.49
Fixed Income					
Bloomberg Barclays Aggregate	0.67	7.51	4.44	3.84	5.16
90-day T-Bill	0.03	0.67	1.20	0.64	2.27
Bloomberg Barclays Long Gov/Credit	1.68	16.12	9.35	8.16	7.42
Bloomberg Barclays Global Agg ex-US	5.09	10.11	4.89	1.99	3.97
Real Estate					
NCREIF Property	0.74	1.19	5.82	8.96	9.08
FTSE Nareit Equity	11.57	-8.00	4.77	8.31	9.64
Alternatives					
CS:Hedge Fund Idx*	3.44	2.41	2.76	3.64	7.25
Cambridge Private Equity*	10.82	18.54	13.90	13.85	15.41
Bloomberg Commodity	10.19	-3.12	1.03	-6.50	1.00
Gold Spot Price	-0.02	24.42	12.32	2.92	6.55
Inflation - CPI-U	0.07	1.36	1.59	1.66	2.10

*Cambridge PE data through 09/30/20; CS Hedge Fund Index data through 9/30/20

Sources: Bloomberg, Bloomberg Barclays, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

Callan Periodic Table of Investment Returns

Monthly Returns												Annual Returns
Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	2020
U.S. Fixed Income	U.S. Fixed Income	U.S. Fixed Income	Small Cap Equity	Small Cap Equity	Emerging Market Equity	Emerging Market Equity	Large Cap Equity	U.S. Fixed Income	Small Cap Equity	Large Cap Equity	Small Cap Equity	Small Cap Equity
1.92%	1.80%	-0.59%	13.74%	6.51%	7.35%	8.94%	7.19%	-0.05%	2.09%	14.02%	8.65%	19.96%
Real Estate	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	Large Cap Equity	Large Cap Equity	Small Cap Equity	Large Cap Equity	Small Cap Equity	Global ex-U.S. Fixed Income	Emerging Market Equity	Small Cap Equity	Emerging Market Equity	Large Cap Equity
0.84%	-0.20%	-3.22%	12.82%	4.76%	3.53%	5.64%	5.63%	-0.58%	2.06%	10.41%	7.35%	18.40%
Global ex-U.S. Fixed Income	High Yield	High Yield	Emerging Market Equity	High Yield	Dev ex-U.S. Equity	High Yield	Dev ex-U.S. Equity	High Yield	High Yield	Emerging Market Equity	Dev ex-U.S. Equity	Emerging Market Equity
0.76%	-1.41%	-11.46%	9.16%	4.41%	3.42%	4.69%	5.16%	-1.03%	0.51%	10.20%	4.55%	18.31%
High Yield	Emerging Market Equity	Large Cap Equity	Real Estate	Dev ex-U.S. Equity	Real Estate	Global ex-U.S. Fixed Income	Real Estate	Emerging Market Equity	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	Large Cap Equity	Global ex-U.S. Fixed Income
0.03%	-5.27%	-12.35%	7.06%	4.25%	2.57%	4.44%	2.52%	-1.60%	0.46%	7.76%	3.84%	10.11%
Large Cap Equity	Large Cap Equity	Dev ex-U.S. Equity	Dev ex-U.S. Equity	Emerging Market Equity	Large Cap Equity	Real Estate	Emerging Market Equity	Dev ex-U.S. Equity	U.S. Fixed Income	U.S. Fixed Income	Real Estate	Dev ex-U.S. Equity
-0.04%	-8.23%	-14.12%	6.97%	0.77%	1.99%	2.78%	2.21%	-2.82%	-0.45%	7.36%	3.51%	7.59%
Dev ex-U.S. Equity	Real Estate	Emerging Market Equity	High Yield	U.S. Fixed Income	Global ex-U.S. Fixed Income	Small Cap Equity	High Yield	Real Estate	Large Cap Equity	High Yield	Global ex-U.S. Fixed Income	U.S. Fixed Income
-1.94%	-8.24%	-15.40%	4.51%	0.47%	1.01%	2.77%	0.95%	-3.11%	-2.66%	5.13%	2.17%	7.51%
Small Cap Equity	Small Cap Equity	Small Cap Equity	Global ex-U.S. Fixed Income	Global ex-U.S. Fixed Income	High Yield	Dev ex-U.S. Equity	Global ex-U.S. Fixed Income	Small Cap Equity	Real Estate	Dev ex-U.S. Equity	High Yield	High Yield
-3.21%	-8.42%	-21.73%	2.04%	0.30%	0.98%	2.66%	0.29%	-3.34%	-3.33%	2.91%	1.88%	7.11%
Emerging Market Equity	Dev ex-U.S. Equity	Real Estate	U.S. Fixed Income	Real Estate	U.S. Fixed Income	U.S. Fixed Income	U.S. Fixed Income	Large Cap Equity	Dev ex-U.S. Equity	Real Estate	U.S. Fixed Income	Real Estate
-4.66%	-8.88%	-22.76%	1.78%	0.23%	0.63%	1.49%	-0.81%	-3.80%	-3.93%	-12.12%	0.14%	-9.04%

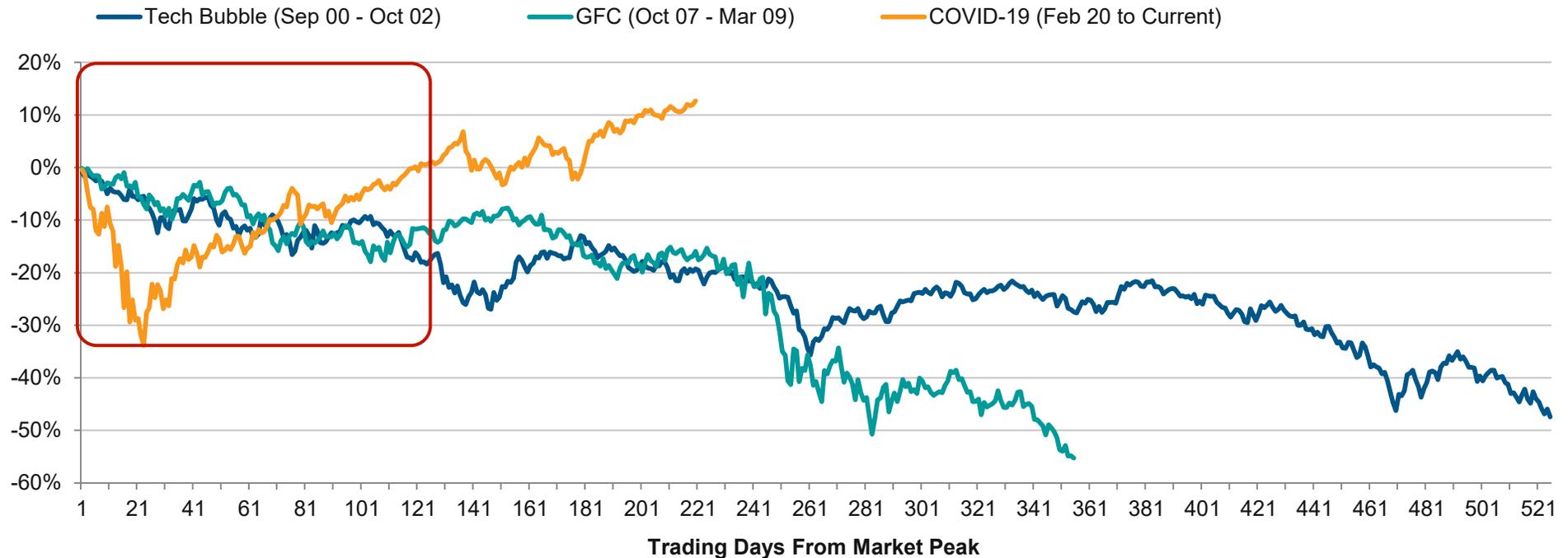
Sources: ● Bloomberg Barclays Aggregate ● Bloomberg Barclays Corp High Yield ● Bloomberg Barclays Global Aggregate ex US
● FTSE EPRA Nareit Developed ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2000 ● S&P 500

Unprecedented Shock to Global Capital Markets—Is It Really Over?

V-shaped recovery in equity—back in black by mid-August, up 18.4% for the year!

S&P 500 Cumulative Returns

Market Peak-to-Trough for Recent Corrections vs. Current Path of COVID-19 Correction Through 12/31/20



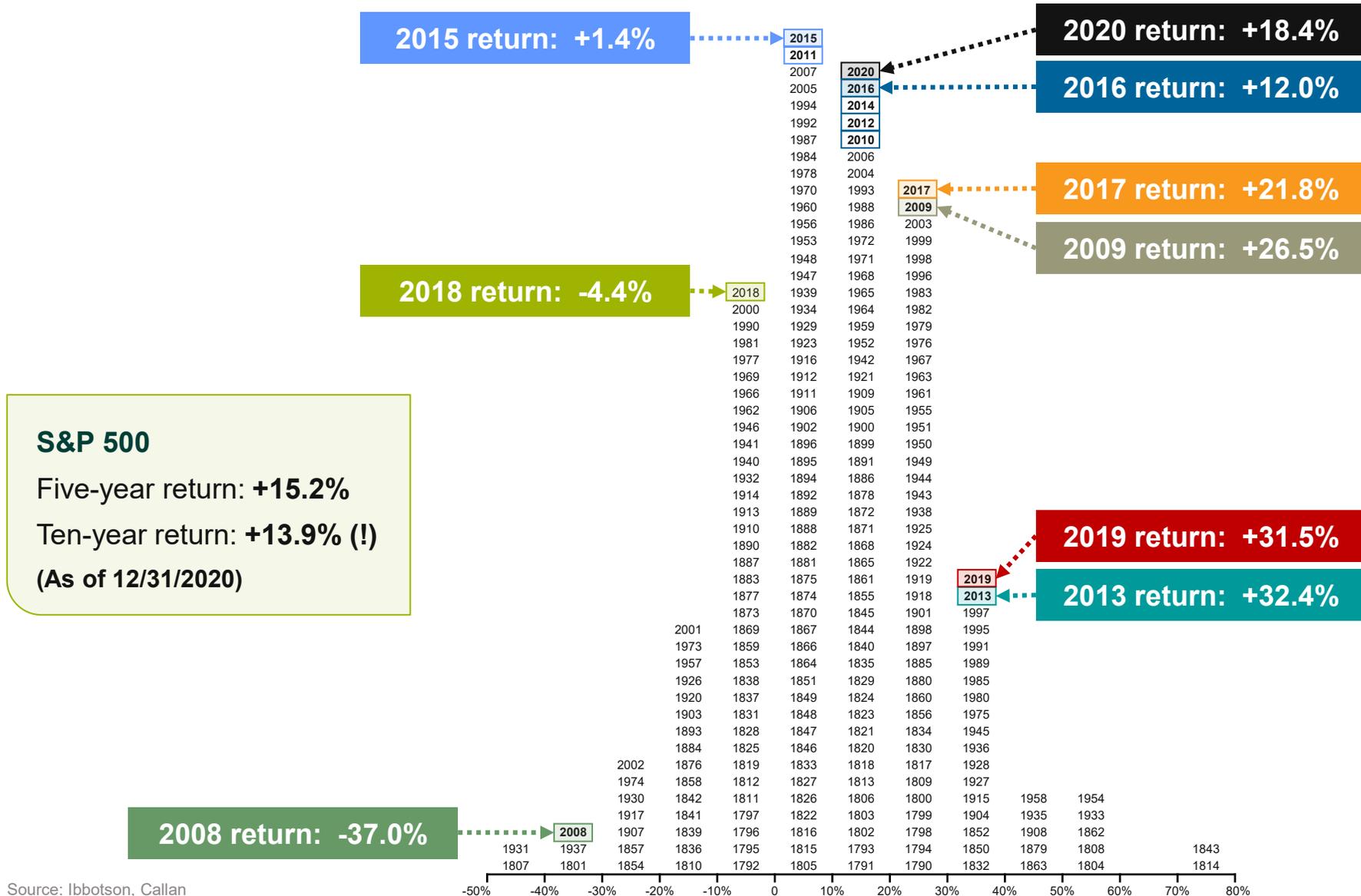
The sharpest and fastest equity market decline ever: 16 trading days to reach bear market; -33% after just 23 days

- Incredible rebound in U.S. equity market in 2Q and 3Q
 - The S&P 500 recovered all of its COVID-19 related losses by August 10, only 97 days from the bottom
 - 70% return from the market bottom through December 31, 2020
 - Positive return year-to-date (+18.4% through December 31, 2020)

Sources: Callan, S&P Dow Jones Indices

Stock Market Returns by Calendar Year

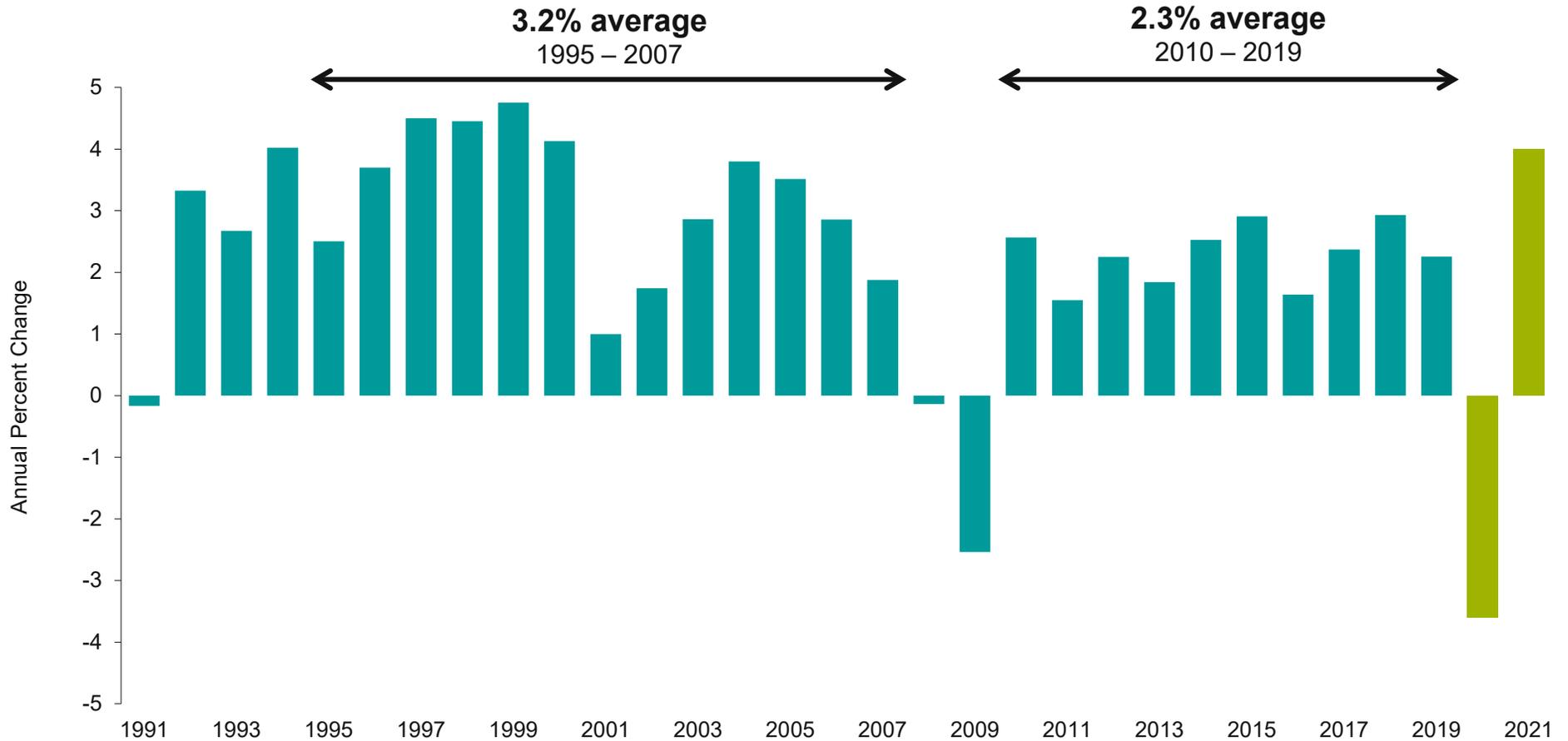
2020 performance in perspective: History of the U.S. stock market (231 years of returns)



Source: Ibbotson, Callan

U.S. GDP Growth on a Slower Trajectory

Real GDP growth



Note: 2020 and 2021 Forecast: IHS Markit

Source: IHS Markit

Market Environment: 3Q20

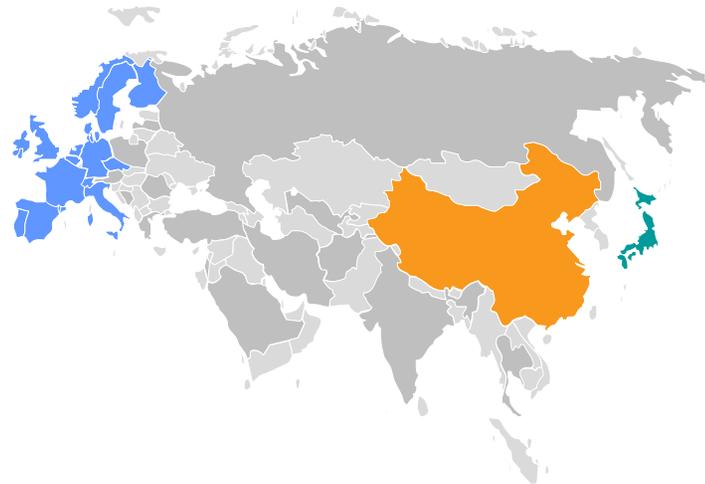
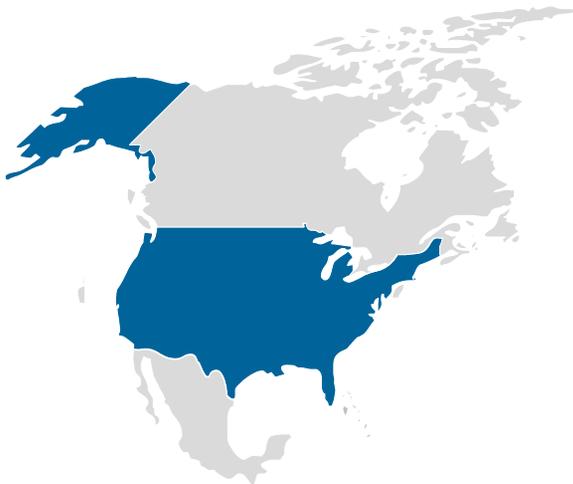
High degree of uncertainty

U.S.

- 2Q GDP fell -31.4%, largest decline on record; 3Q gain of 33%, solid growth of 3% estimated for 4Q
- Retail sales, durable goods, and personal spending rebounded in 2Q and 3Q, but growth slowed in August and September as stimulus waned
- Unemployment dropped to 6.7% in November from 14.7% April peak
 - Jobless claims decelerated to less than 1 million per week, but are still elevated relative to prior recession peaks.
- Housing benefiting from relatively low mortgage rates
- Fed left rates close to 0% and expects to be on hold until at least 2023

Overseas

- Euro zone 1Q GDP contracted 3.7 (-14% annualized), followed by 11.7% drop (-39.2% annualized) in 2Q; largest Q drop on record; 12.5% jump (60% annualized!) in 3Q
- U.K. GDP sank 18.8% in 2Q (-57% annualized)—most ever, rebounded 16% (81% annualized) in 3Q
- Japan's economy shrank 8.3% (-29% annualized) in 2Q; third straight quarterly drop, dating back to 2019; 5.3% growth (22.9% annualized) in 3Q
- China's GDP fell 10% (-34% annualized) in 1Q, but rebounded 11.7% (+56%) in 2Q and is up 2.7% (11.3% annualized) in 3Q; only country expected to grow in 2020



Economic Outlook

Role of economic variables

GDP and Inflation

GDP forecasts provide a very rough estimate of future earnings growth.

Inflation forecasts provide an approximate path for short-term yields.

Inflation is added to the real return forecasts for equity and fixed income.

GDP Forecasts

- 2% to 2.5% for the U.S.
- 1.5% to 2.0% for developed ex-U.S. markets
- 4% to 5% for emerging markets

All forecasts are below long-term averages.

Path to longer-term growth will include cycles with recessions.

Inflation Forecasts

- 1.75% to 2.25% for the U.S.
- 1.5% to 2.0% for developed ex-U.S. markets
- 2.25% to 2.75% for emerging markets

Callan

Fixed Income

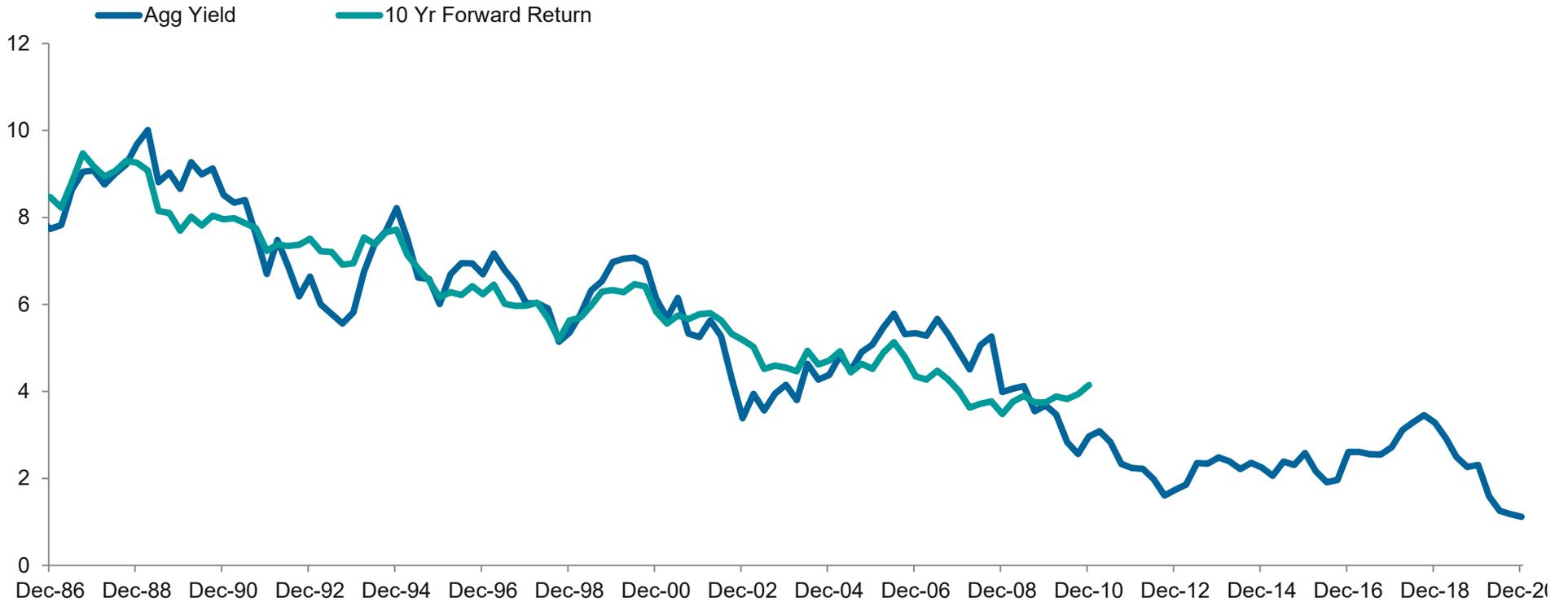
2021 Bond Assumptions

	Income Return	+	Capital Gain / Loss	+	Credit Default	+	Roll Return	=	2021 Expected Return
Cash	1.00%		0.00%		0.00%		0.00%		1.00%
Short Duration 1-3 Year G/C	1.55%		-0.30%		0.00%		0.25%		1.50%
1-3 Year Government	1.45%		-0.30%		0.00%		0.25%		1.40%
1-3 Year Credit	2.10%		-0.30%		-0.20%		0.25%		1.85%
Intermediate G/C	1.85%		-0.50%		-0.10%		0.25%		1.50%
Intermediate Government	1.55%		-0.50%		0.00%		0.25%		1.30%
Intermediate Credit	2.50%		-0.60%		-0.30%		0.25%		1.85%
Aggregate	2.50%		-0.90%		-0.10%		0.25%		1.75%
Government	2.15%		-1.20%		0.00%		0.25%		1.20%
Securitized	2.05%		-0.30%		0.00%		0.25%		2.00%
Credit	3.35%		-1.20%		-0.40%		0.25%		2.00%
Long Duration G/C	4.00%		-2.50%		-0.30%		0.60%		1.80%
Long Government	3.00%		-3.00%		0.00%		0.60%		0.60%
Long Credit	4.65%		-2.30%		-0.50%		0.60%		2.45%
TIPS	2.35%		-0.90%		0.00%		0.25%		1.70%
Global ex-U.S. Fixed (unhedged)	1.80%		-1.20%		-0.10%		0.25%		0.75%
High Yield	6.70%		-0.40%		-2.20%		0.25%		4.35%
Emerging Market Debt	5.95%		-1.30%		-1.40%		0.25%		3.50%
Bank Loans	6.00%		-0.10%		-1.60%		0.00%		4.30%

- Yields declined significantly in 2020
- Rising yields in Callan's baseline are especially supportive of shorter duration fixed income

Starting Yield Strongly Predicted Returns

Bloomberg Barclays Aggregate Starting Yield vs. 10-Year Forward Return

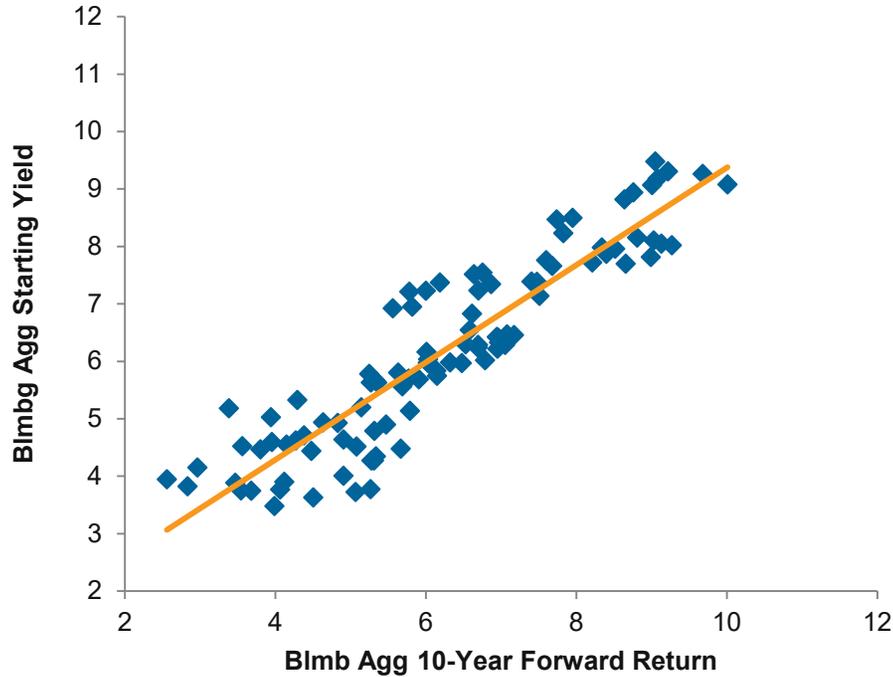


- There is a strong relationship between starting yields and subsequent 10-Year returns.

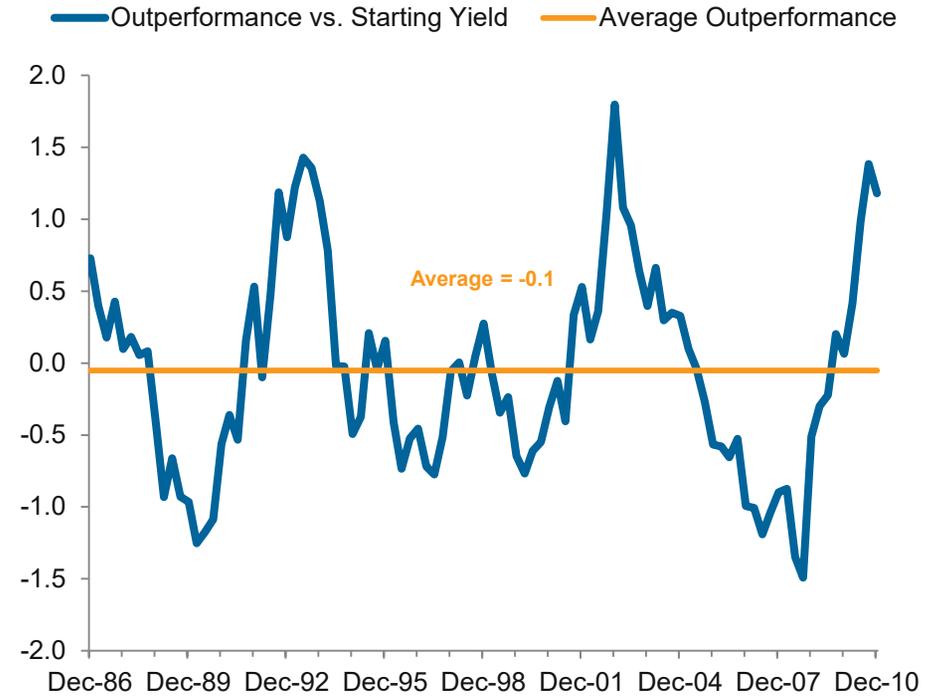
Sources: Bloomberg Barclays

Starting Yield Strongly Predicted Forward Return

Bloomberg Barclays Agg Starting Yield vs. 10-Yr Forward Return



Bloomberg Barclays Agg Outperformance vs. Starting Yield



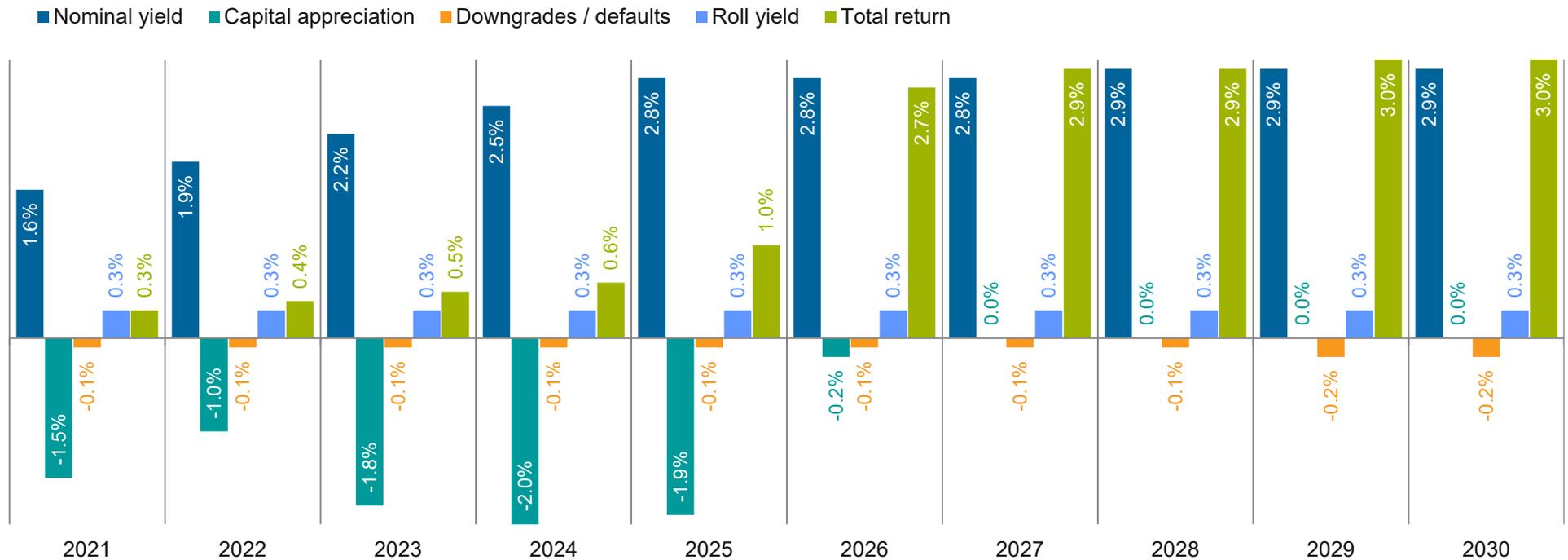
Bond Market Outperformance vs. Starting Yield Summary Statistics – Yield Defines Return in Median Case

Min	Percentile							Max
	1%	5%	25%	50%	75%	95%	99%	
-1.49	-1.35	-1.10	-0.56	-0.05	0.39	1.19	1.44	1.80

Sources: Bloomberg Barclays

2021–2030 Aggregate Return = 1.75%

Total Return Attribution



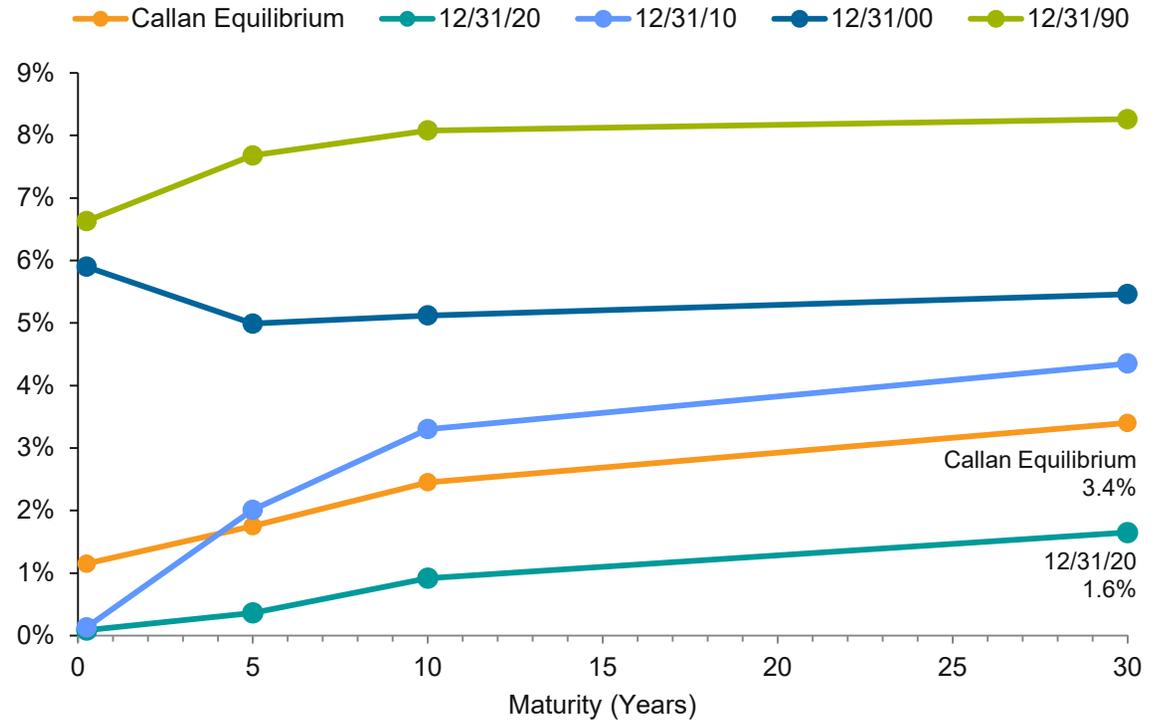
- Above chart shows return components of the aggregate over the next 10 years
 - Aggregate yield rises about 120 bps over five years
- We examined a variety of scenarios to test their impact on assumed return for the aggregate
 - Fixed income duration falls slightly in a rising rate environment
 - Narrowing of credit and securitized spreads

Callan Equilibrium Yield Curve – Target for 10-Year Projection

The Callan equilibrium yield curve is higher and steeper than the current yield curve

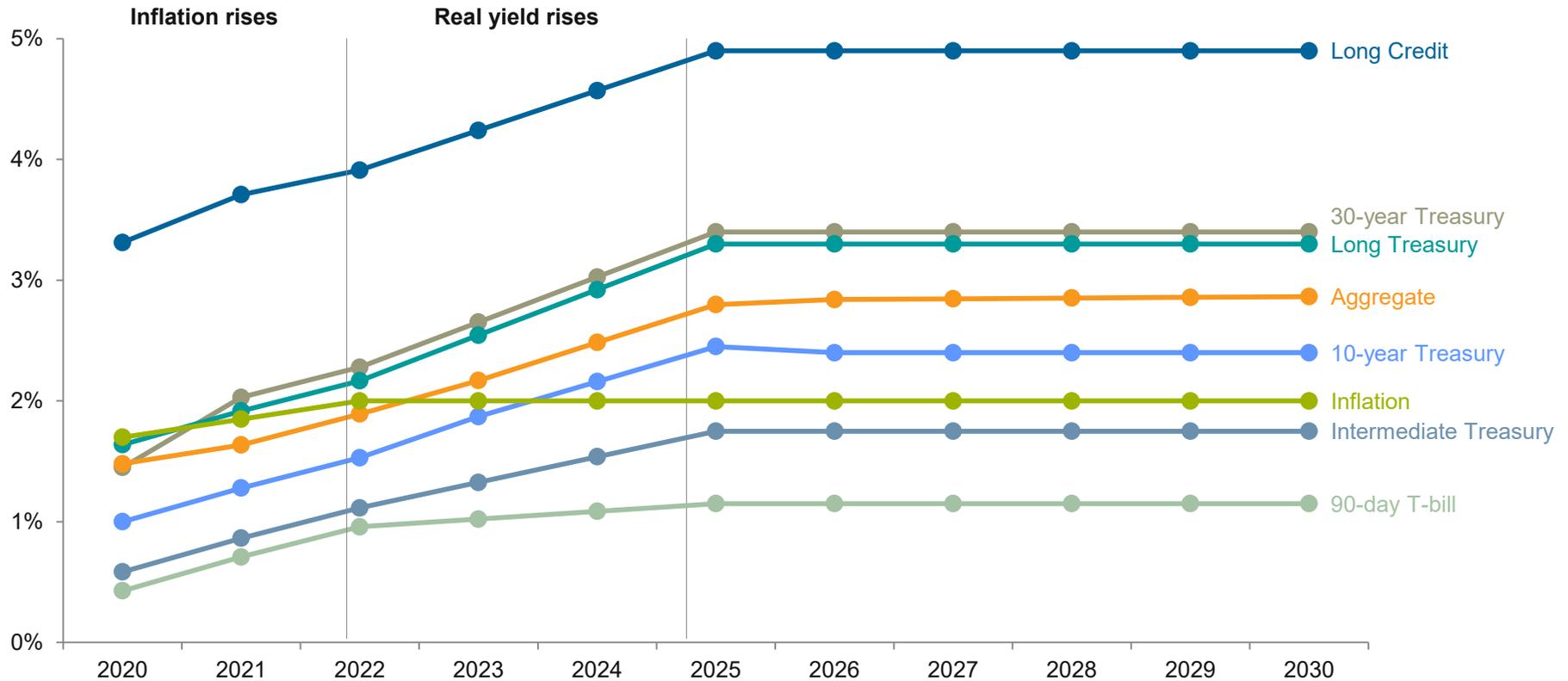
	Callan Equilibrium
90-day T-bill	1.15%
Intermediate Treasury	1.75%
10-year Treasury	2.45%
30-year Treasury	3.40%

Yield Curves (Callan Equilibrium vs. U. S Treasury)



Sources: FRED

Base Case Yield Curve Path



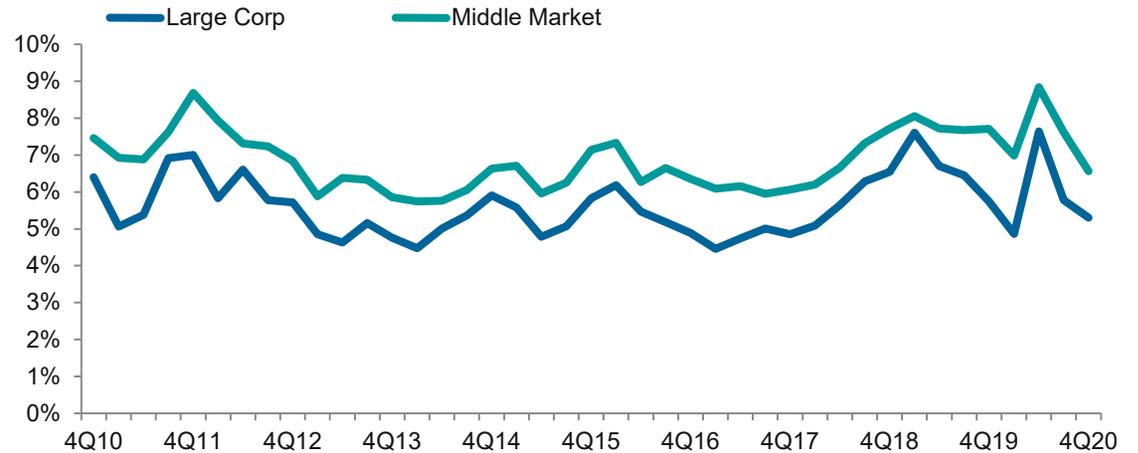
- Rate rise in first two years is due to inflation only
 - Inflation rises from 1.7% to 2.0% over 2 years – 15 bps per year
- Cash and Intermediate Treasury have negative real yields over the next 10 years

Private Credit

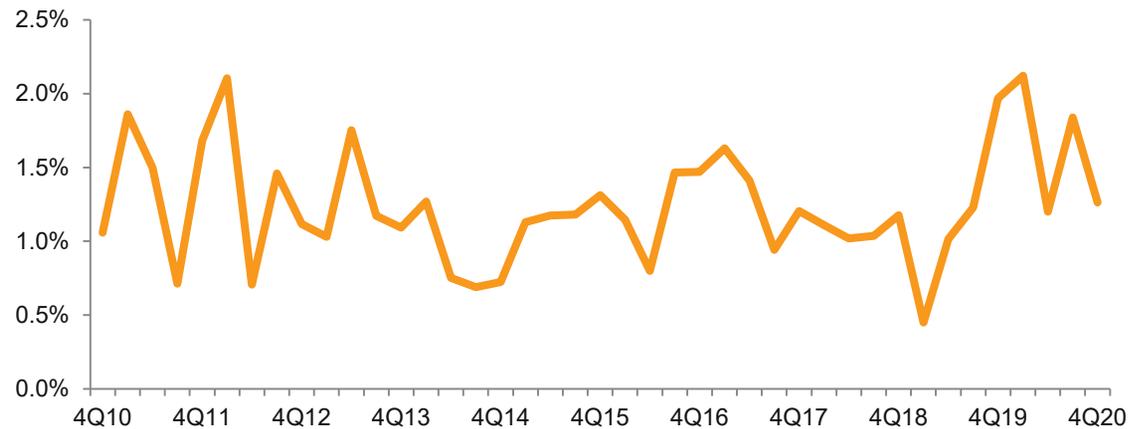
- Return calculations assume 2.5% cost of leverage and 0.75% unlevered loss ratio
- Corresponds to 6.25% geometric

Unlevered Yield	7.5%
Leverage	0.85x
Levered Yield	11.6%
Management Fee and Operating Expense	2%
Incentive Rate	15%
Hurdle	4%
Incentive Fee	1%
Total Fee	3%
Loss Ratio	1.4%
Net Arithmetic	7%

Loan Yields



Middle Market Premium



Source: Refinitiv LPC. All-in yield (LIBOR + Spread + OID) assuming 3-year takeout
 Note: 2Q20 was deemed less reliable due to lack of data points to calculate a MM institutional all-in yield statistic

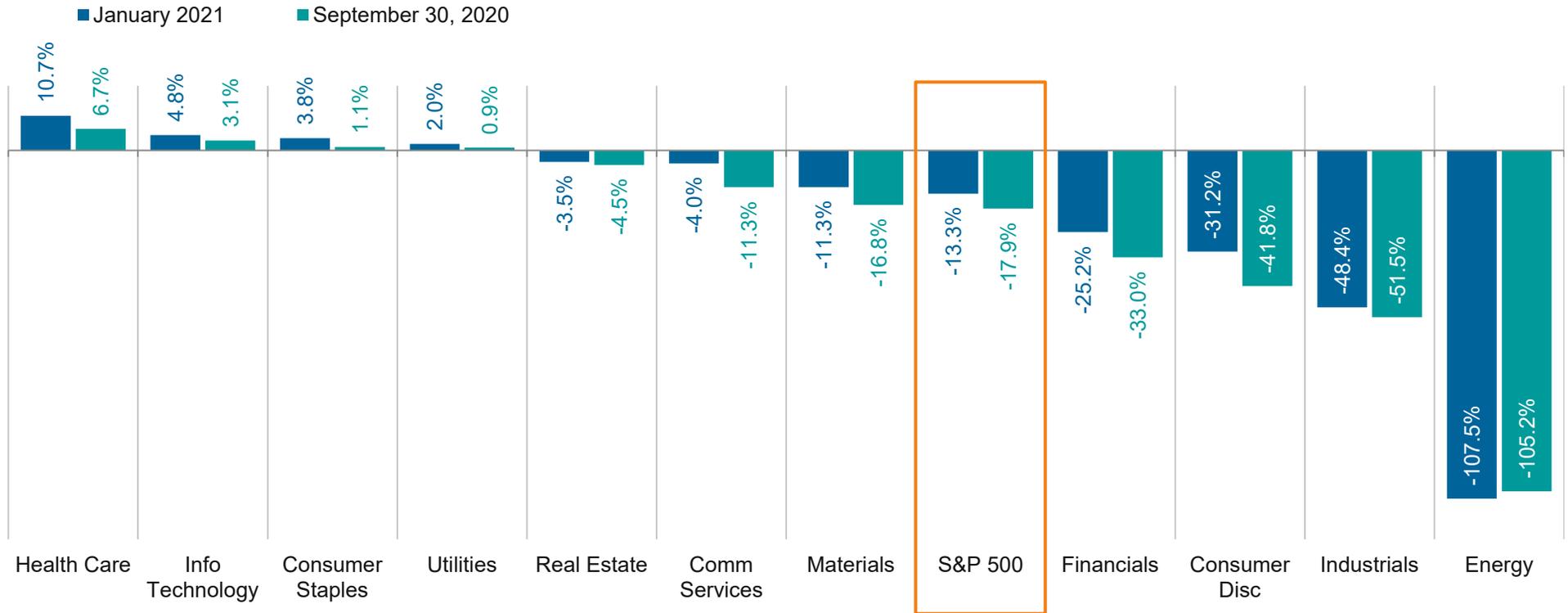
Callan

Equity

U.S. Equity Projections - 2020

Large cap earnings

S&P 500 Earnings Growth: Calendar Year 2020



Earnings likely took a significant hit across most sectors in calendar year 2020

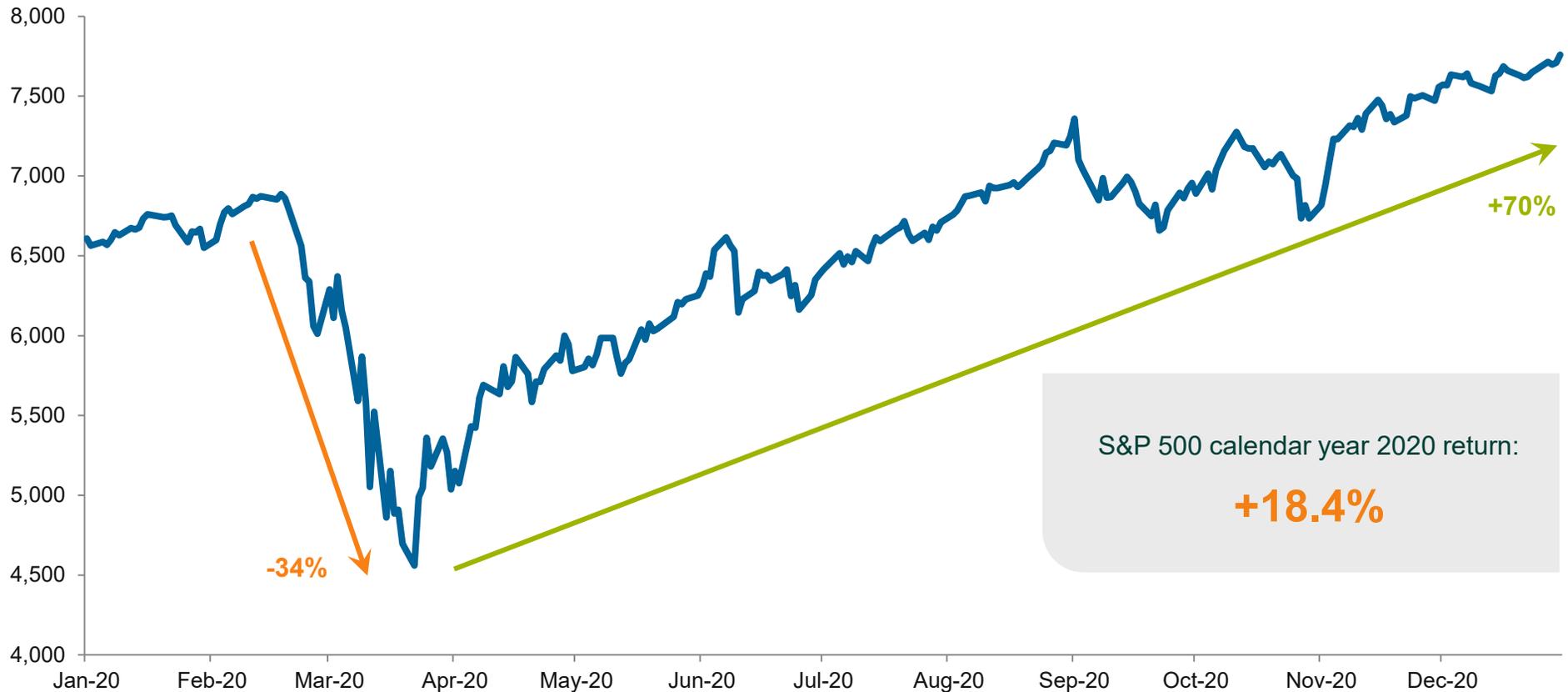
- Earnings for the S&P as a whole are expected to be down over 13%
- Health Care, Information Technology, Consumer Staples, and Utilities were the only sectors expected to have positive 2020 earnings
- 5 sectors expected to have double-digit declines

Source: FactSet Earnings Insight as of January 8, 2021.

U.S. Equity Projections

Large cap valuations

S&P 500 Total Return Price Index Calendar Year 2020



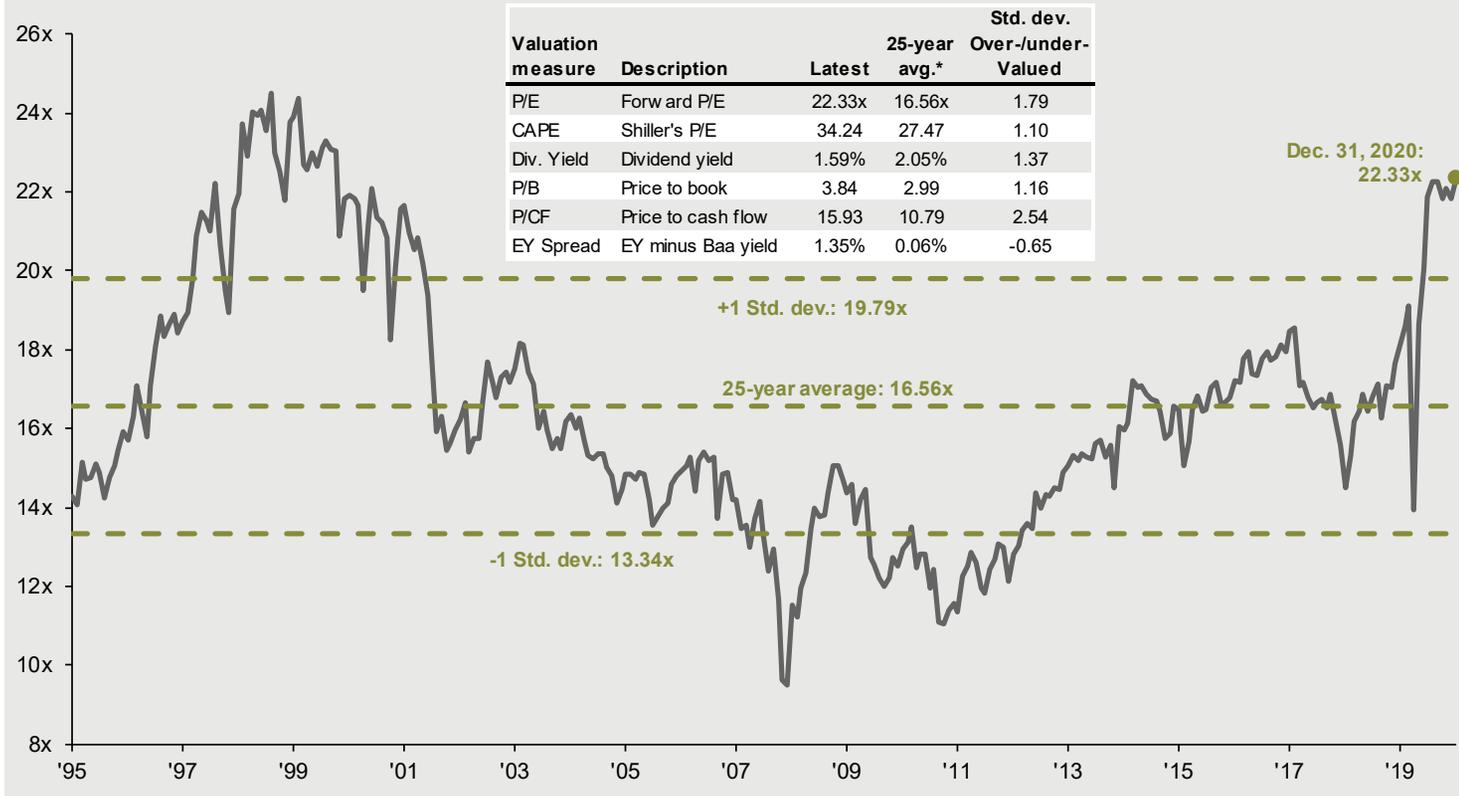
- Substantial price appreciation has occurred in spite of poor earnings
- Low Treasury yields are helping to support valuations

Source: S&P Dow Jones Indices.

U.S. Equity Projections

Large cap valuations

S&P 500 Index: Forward P/E ratio



Price-to-earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months as provided by IBES since December 1995, and FactSet for December 31, 2020. Current next 12-months consensus earnings estimates are \$167. Average P/E and standard deviations are calculated using 25 years of IBES history. Shiller's P/E uses trailing 10-years of inflation-adjusted earnings as reported by companies. Dividend yield is calculated as the next 12-months consensus dividend divided by most recent price. Price-to-book ratio is the price divided by book value per share. Price-to-cash flow is price divided by NTM cash flow. EY minus Baa yield is the forward earnings yield (consensus analyst estimates of EPS over the next 12 months divided by price) minus the Moody's Baa seasoned corporate bond yield. Std. dev. over-/under-valued is calculated using the average and standard deviation over 25 years for each measure.

Guide to the Markets – U.S. Data are as of December 31, 2020.

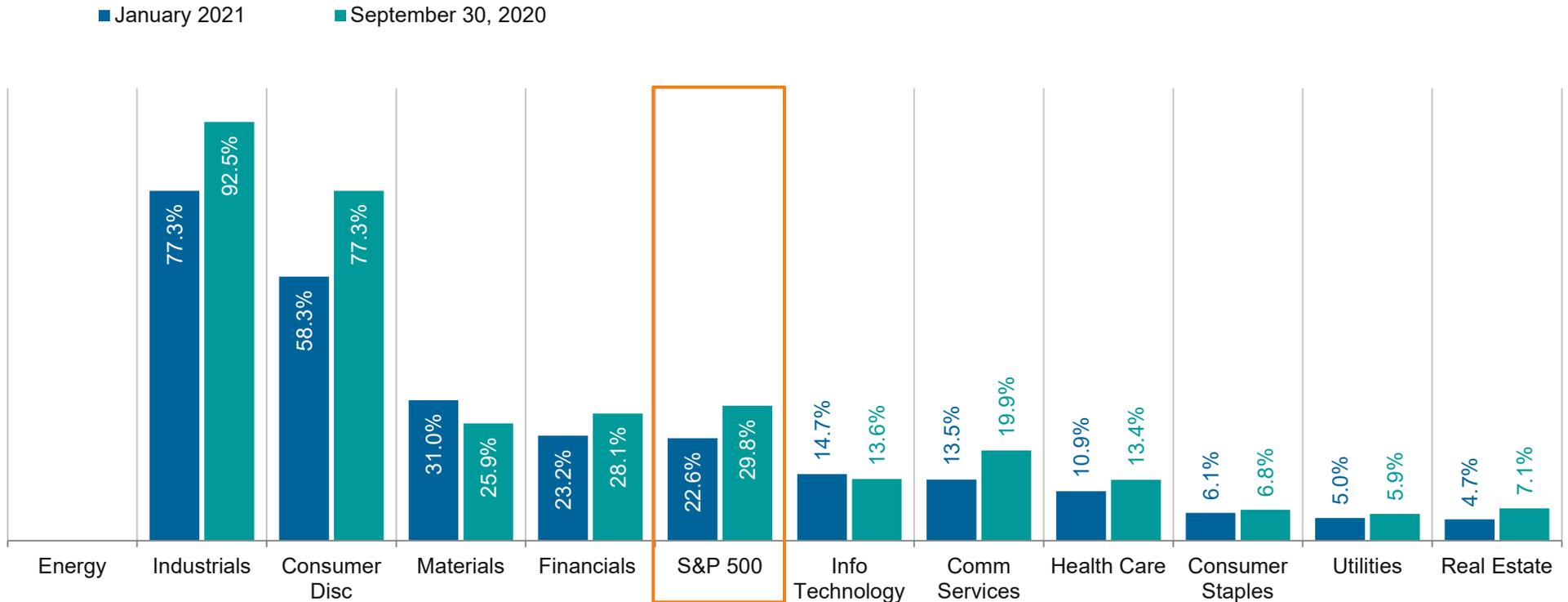
- Valuations are 1.8 standard deviations above the 25-year average based on forecast earnings
- Longer term historical valuations are also elevated
 - Shiller's cyclically adjusted price earnings (CAPE) ratio is 1.1 standard deviation above average
- Stock prices reflect anticipated rather than historical earnings

Sources: FactSet, FRB, Robert Shiller, S&P Dow Jones Indices, Thomson Reuters, J.P. Morgan Asset Management.

U.S. Equity Projections - 2021

Large cap earnings

S&P 500 Earnings Growth: Calendar Year 2021



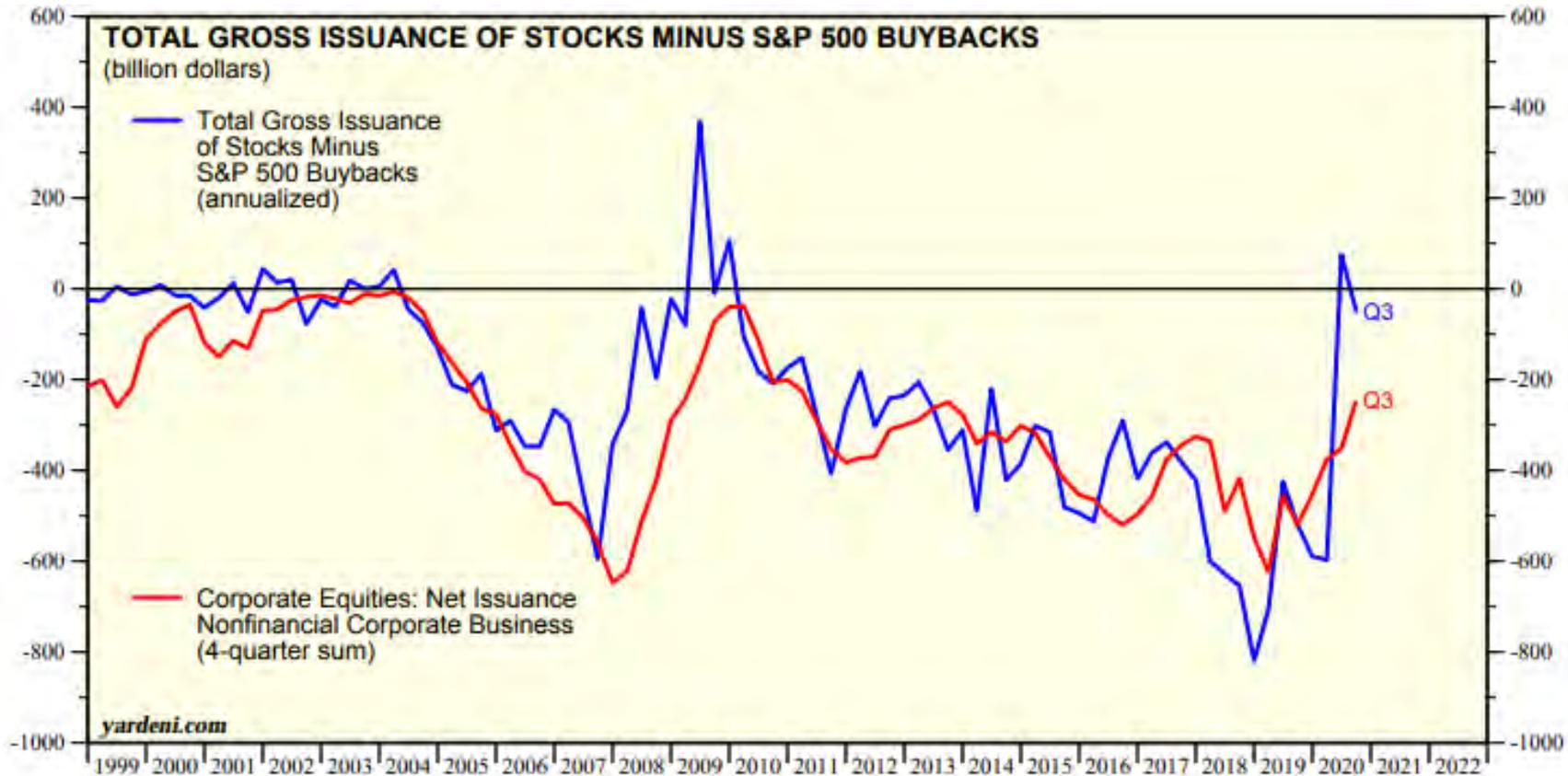
- Earnings expected to continue their bounce back
- S&P 500 earnings growth in excess of 20% is projected in 2021
 - 7 sectors expected to realized double-digit earnings growth
- However confidence is eroding
 - Earnings estimates in many sectors are down from the end of 3Q, some significantly

Source: FactSet Earnings Insight as of January 8, 2021.

Note: Energy earnings estimates are negative for 2020; cannot compute a growth rate over 2021. Analysts expect energy to show the highest growth in earnings among all sectors.

U.S. Equity Projections

Stock net issuance



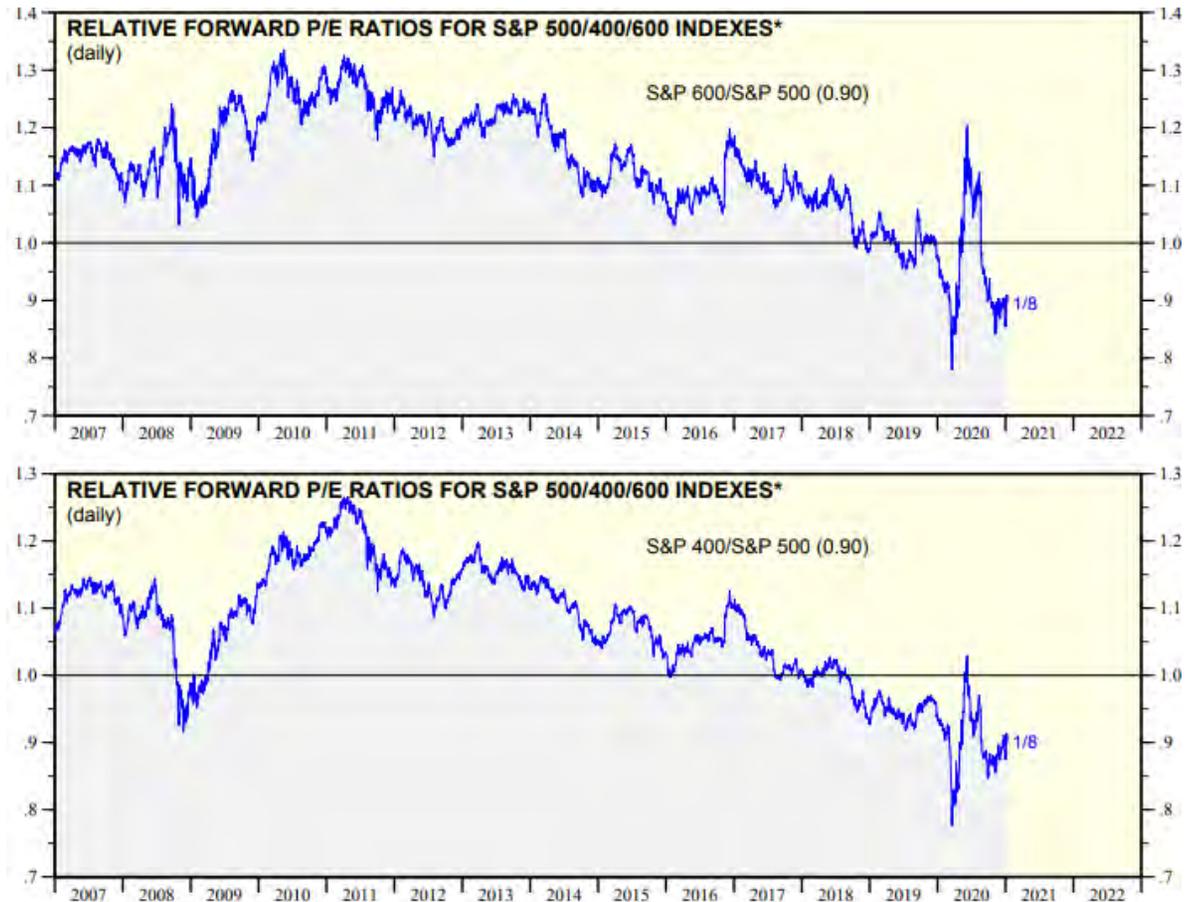
- Net issuance has generally been negative for almost 20 years
- Negative net new issuance has boosted EPS
- Recent increases in net new issuance reflect similar patterns near the GFC
 - Could provide a head wind for future returns

Source: Yardeni.com (Federal Reserve Board and Standard & Poor's Corporation)

U.S. Equity Projections

Mid and small cap relative valuations

- Large capitalization stocks have relatively high valuations
- Historically, smaller cap stocks have had higher valuations than large caps
 - Investors buying future rather than historical earnings
- The small cap S&P 600 P/E is only 90% of the S&P 500 P/E
- The mid cap S&P 400 P/E is only 90% of the S&P 500 P/E
- Lower valuations improve the potential for higher returns relative to large cap going forward



Source: Yardeni.com

Global ex-U.S. Equity Projections

Developed market valuations and dividend yield



- Valuations are generally high in developed markets
 - U.S. has the highest valuations
 - U.K. has the lowest valuations most likely due to Brexit
- Low dividend yields have a direct impact on returns
 - Depressed in the current environment

Source: MSCI; data as of 12/31/2020

Global ex-U.S. Equity Projections

Emerging market valuations and dividend yield



- Emerging markets also have elevated valuations
 - Among the BRICs, India has the highest valuation metrics while Russia is lagging
 - Asia has the highest regional valuations, Europe the lowest
- Significant dilution as growing companies issue more shares

Source: MSCI; data as of 12/31/2020

U.S. Equity Projections

Large and smid cap

- S&P 500
 - Arithmetic return = 7.85%
 - Compound return = 6.50%
 - Standard deviation = 17.70%
 - Compound return falls by 50 bps relative to 2020
 - Valuation adjustment and lower inflation are drags on the nominal return
- Russell 2500
 - Arithmetic return = 8.75%
 - Compound return = 6.70%
 - Standard deviation = 21.30%
 - Compound return reduced by 55 bps from 2020 projection
 - Low earnings and dividends as well as inflation weigh on returns

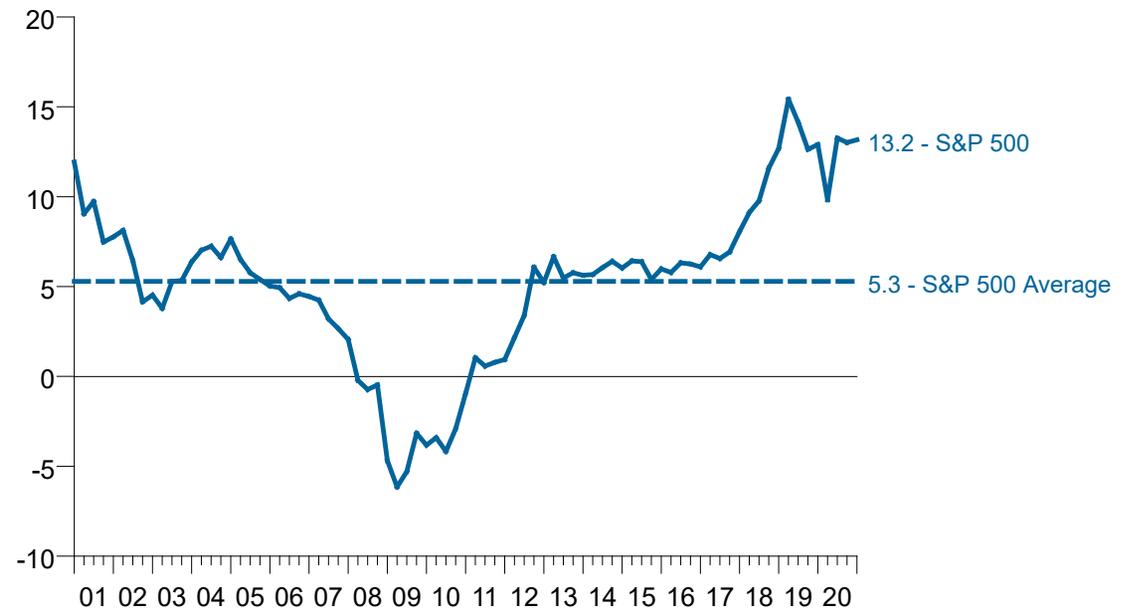
Index	S&P 500	Russell 2500
Dividend yield	2.00%	1.75%
Net buyback yield	0.50%	0.00%
Real earnings growth	2.25%	2.95%
Valuation adjustment	-0.25%	0.00%
Inflation	2.00%	2.00%
2021 compound return	6.50%	6.70%
2020 compound return	7.00%	7.25%
Change	-0.50%	-0.55%

U.S. Equity Projections

Equity risk premium: S&P 500 vs. T-bills

- Over the very long term, the equity risk premium (ERP) vs. cash is around 6%.
- Callan equity projection is at T-bills + 5.5%, a conservative estimate relative to long-term history.
- Over the past 20 years ERP vs. cash is lower at around 5%.
- Cash at 1.0%, ERP at 5.5% = Equity Return of 6.50%

Rolling 40-Quarter Relative Returns Relative to 90-day T-bill for 20 Years Ended 12/31/20



Source: Ibbotson

Global ex-U.S. Equity Projections

Developed and emerging markets

- Developed ex-U.S.
 - Arithmetic return = 8.25%
 - Compound return = 6.50%
 - Standard deviation = 19.90%
 - Compound return declines by 50 bps relative to 2020
 - Substantial decline in dividend yield partly offset by improved earnings growth
- Emerging Markets
 - Arithmetic return = 9.80%
 - Compound return = 6.90%
 - Standard deviation = 25.15%
 - 35 bps drop in compound return relative to 2020 projection
 - High earnings growth dented by significant share dilution
 - Relatively high expected inflation increases nominal return

Index	MSCI World ex USA	MSCI Emerging Markets
Dividend yield	3.00%	2.35%
Net buyback yield	0.00%	-2.35%
Real earnings growth	1.75%	4.50%
Valuation adjustment	0.00%	0.00%
Inflation	1.75%	2.40%
2021 compound return	6.50%	6.90%
2020 compound return	7.00%	7.25%
Change	-0.50%	-0.35%

Callan

Alternatives

Private Equity

Background

The private equity market in aggregate is driven by many of the same economic factors as public equity markets.

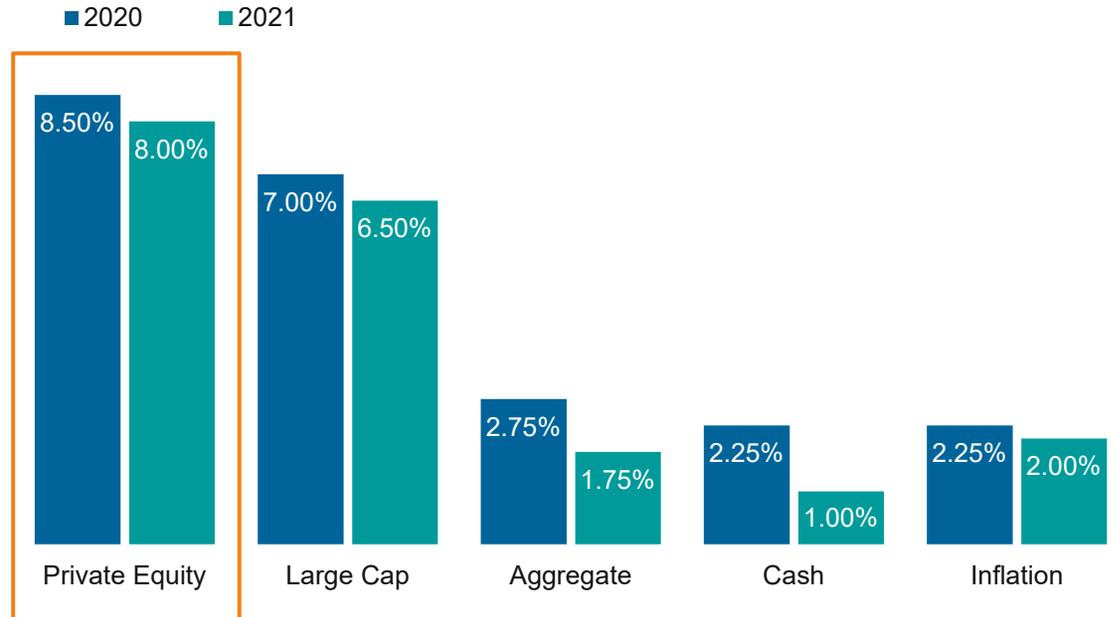
Consequently, the private equity performance expectations declined 50 basis points relative to where they were last year.

We see tremendous disparity between the best- and worst-performing private equity managers.

The ability to select skillful managers could result in realized returns significantly greater than projected here.

2021 private equity return projection: 8.00% (down 50 bps)

Return Projections



Real Estate

Background

Real estate returns held up surprisingly well in 2020.

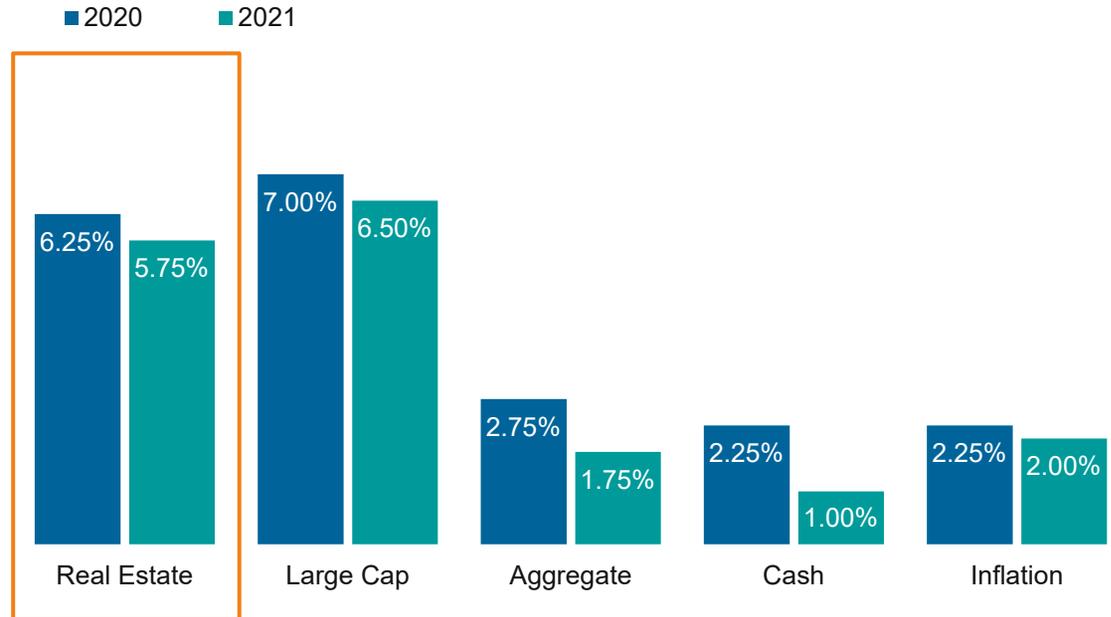
The foreseeable low interest rate environment should help to ensure that real estate continues to garner interest from investors seeking income, supporting returns.

However, the momentum in the industrial space is more than offset by the headwinds faced in the Retail and Office sectors, which should prove to be a drag on performance.

The combination results in a 50 basis point reduction in our outlook for real estate returns compared to last year.

2021 real estate return projection: 5.75% (down 50 bps)

Return Projections



Hedge Funds

Background

Hedge funds can be evaluated in a multi-factor context using the following relationship:

Expected Return = Cash + Equity Beta x (Equity-Cash) + Exotic Beta + Net Alpha

Callan's 10-year cash forecast is 1.00%, which is the starting point for our hedge fund returns.

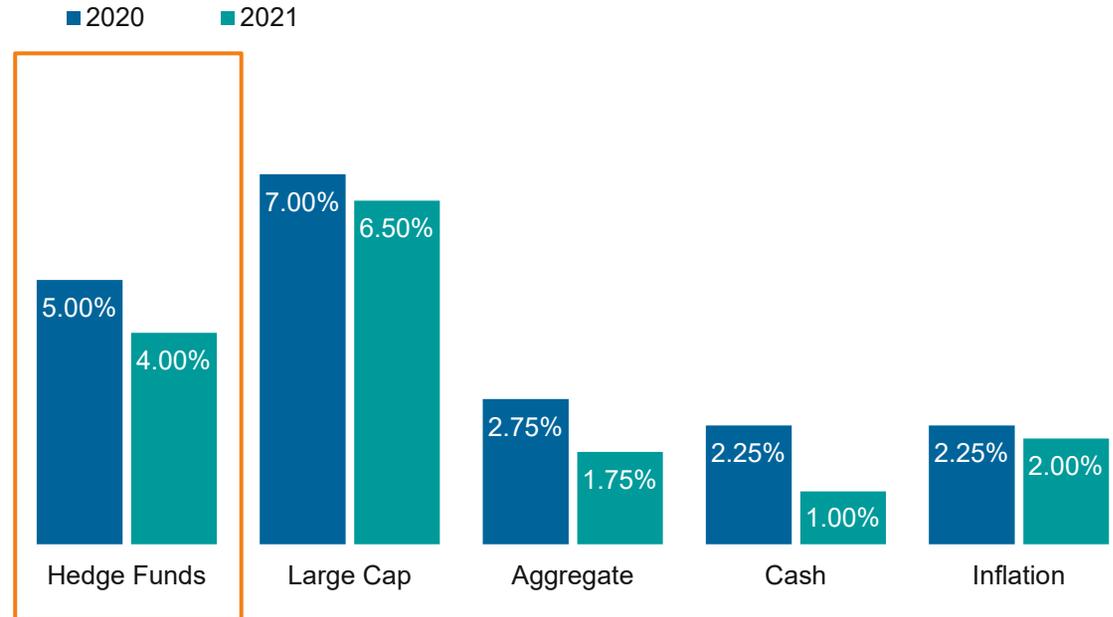
Diversified hedge fund portfolios have historically exhibited equity beta relative to the S&P 500 on the order of 0.4.

Combined with our equity risk premium forecast, this results in an excess return from equity beta of just over 2%.

Return from hedge fund exotic beta and illiquidity premia is forecast to be 0.5% to 1.0%, to arrive at an overall expected return of 4.0%.

2021 hedge fund return projection:
4.00% (down 100 bps)

Return Projections



Private Credit

Background

Return projection is for core, unlevered strategies (mainly direct lending) in an attractive environment for private credit returns and yields.

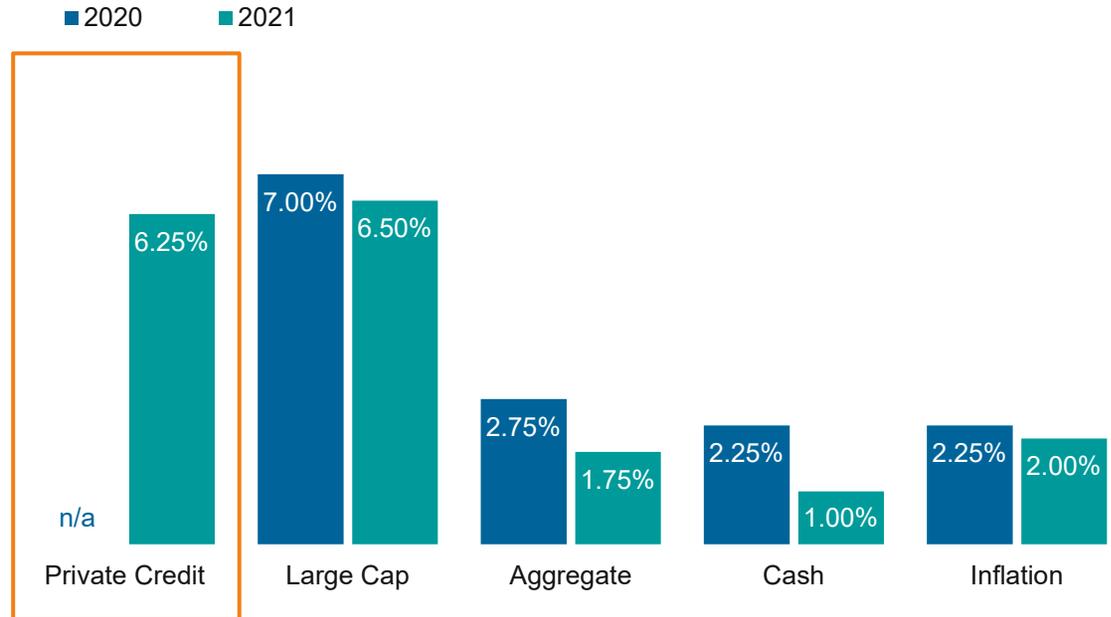
Private credit coupons haven't moved down as much as in the investment grade world since banks still have not re-entered the space.

~200 bps is a reasonable return premium relative to high yield (4.35%) and leveraged loans.

A portfolio with more distressed and specialty finance exposure would have a higher return though with a lower current yield and higher volatility and higher correlation to public and private equity.

2021 private credit return projection: 6.25% (no published projection in 2020)

Return Projections



Callan

**Detailed 2021 Expectations and
Resulting Portfolio Returns and Risks**

2021 vs. 2020 Callan Capital Markets Assumptions

Asset Class	Index	Projected Return			Projected Risk	2020–2029		
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	1-Year Arithmetic	10-Year Geometric*	Standard Deviation
Equities								
Broad U.S. Equity	Russell 3000	8.00%	6.60%	4.60%	17.95%	8.55%	7.15%	18.10%
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.50%	17.70%	8.35%	7.00%	17.70%
Smid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.70%	21.30%	9.25%	7.25%	21.20%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.80%	20.70%	9.10%	7.25%	20.50%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.50%	19.90%	8.70%	7.00%	19.70%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.90%	25.15%	10.25%	7.25%	25.70%
Fixed Income								
Short Duration Gov't/Credit	Bloomberg Barclays 1-3 Yr Gov / Credit	1.50%	1.50%	-0.50%	2.00%	2.70%	2.70%	2.10%
Core U.S. Fixed	Bloomberg Barclays Aggregate	1.80%	1.75%	-0.25%	3.75%	2.80%	2.75%	3.75%
Long Government	Bloomberg Barclays Long Government	1.35%	0.60%	-1.40%	12.50%	2.55%	1.80%	12.50%
Long Credit	Bloomberg Barclays Long Credit	2.95%	2.45%	0.45%	10.50%	3.75%	3.25%	10.50%
Long Government/Credit	Bloomberg Barclays Long Gov / Credit	2.30%	1.80%	-0.20%	10.35%	3.25%	2.75%	10.60%
TIPS	Bloomberg Barclays TIPS	1.80%	1.70%	-0.30%	5.05%	2.50%	2.40%	5.05%
High Yield	Bloomberg Barclays High Yield	4.85%	4.35%	2.35%	10.75%	5.10%	4.65%	10.25%
Global ex-U.S. Fixed	Bloomberg Barclays Global Agg xUSD	1.15%	0.75%	-1.25%	9.20%	1.30%	0.90%	9.20%
Emerging Market Sovereign Debt	EMBI Global Diversified	3.90%	3.50%	1.50%	9.50%	4.70%	4.35%	9.50%
Alternatives								
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.75%	14.10%	7.05%	6.25%	14.00%
Private Infrastructure	MSCI Glb Infra / FTSE Dev Core 50/50	7.00%	6.00%	4.00%	15.45%	n/a	n/a	n/a
Private Equity	Cambridge Private Equity	11.50%	8.00%	6.00%	27.80%	12.00%	8.50%	27.80%
Private Credit	n/a	7.15%	6.25%	4.25%	14.60%	n/a	n/a	n/a
Hedge Funds	Callan Hedge FOF Database	4.25%	4.00%	2.00%	8.00%	5.25%	5.00%	8.70%
Commodities	Bloomberg Commodity	3.80%	2.25%	0.25%	18.00%	4.30%	2.75%	18.00%
Cash Equivalents	90-Day T-Bill	1.00%	1.00%	-1.00%	0.90%	2.25%	2.25%	0.90%
Inflation	CPI-U		2.00%		1.50%		2.25%	1.50%

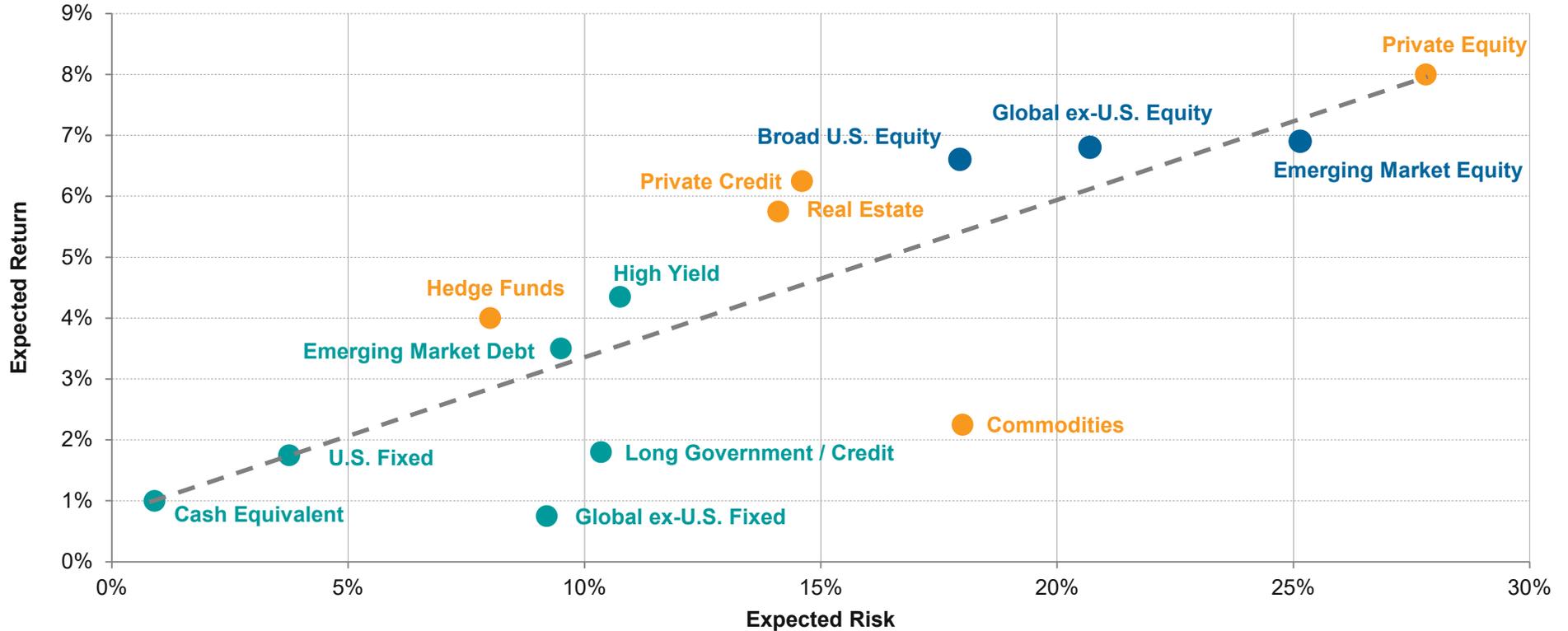
* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Summary of Important Changes for 2021 Capital Markets Assumptions

- Cash return lowered to 1.0%
- Core fixed income return down 1.0%, to 1.75%
- Public equity returns down 45-55 bps; equity risk premium over both cash and fixed income widened
- Inflation lowered 25 bps to 2.0%
- Efficient mid cap weight set to 15% of broad U.S. equity
- Efficient emerging market equity weight set to 30% of global ex-U.S. equity
- Efficient U.S. / global ex-U.S. equity split to 60/40 neutral weight (not a change, but the market has now caught up to us!)
- Private markets returns lowered commensurate with public equity; hedge funds reflect starting cash return
- Ever-broadening set of diversifying asset classes to consider
 - Private credit
 - Private infrastructure
 - Inflation sensitive equity – REITs, natural resources, global listed infrastructure

Relationship Between Expected Return and Risk – Capital Market Line

Visualizing Callan’s 2021–2030 capital markets assumptions



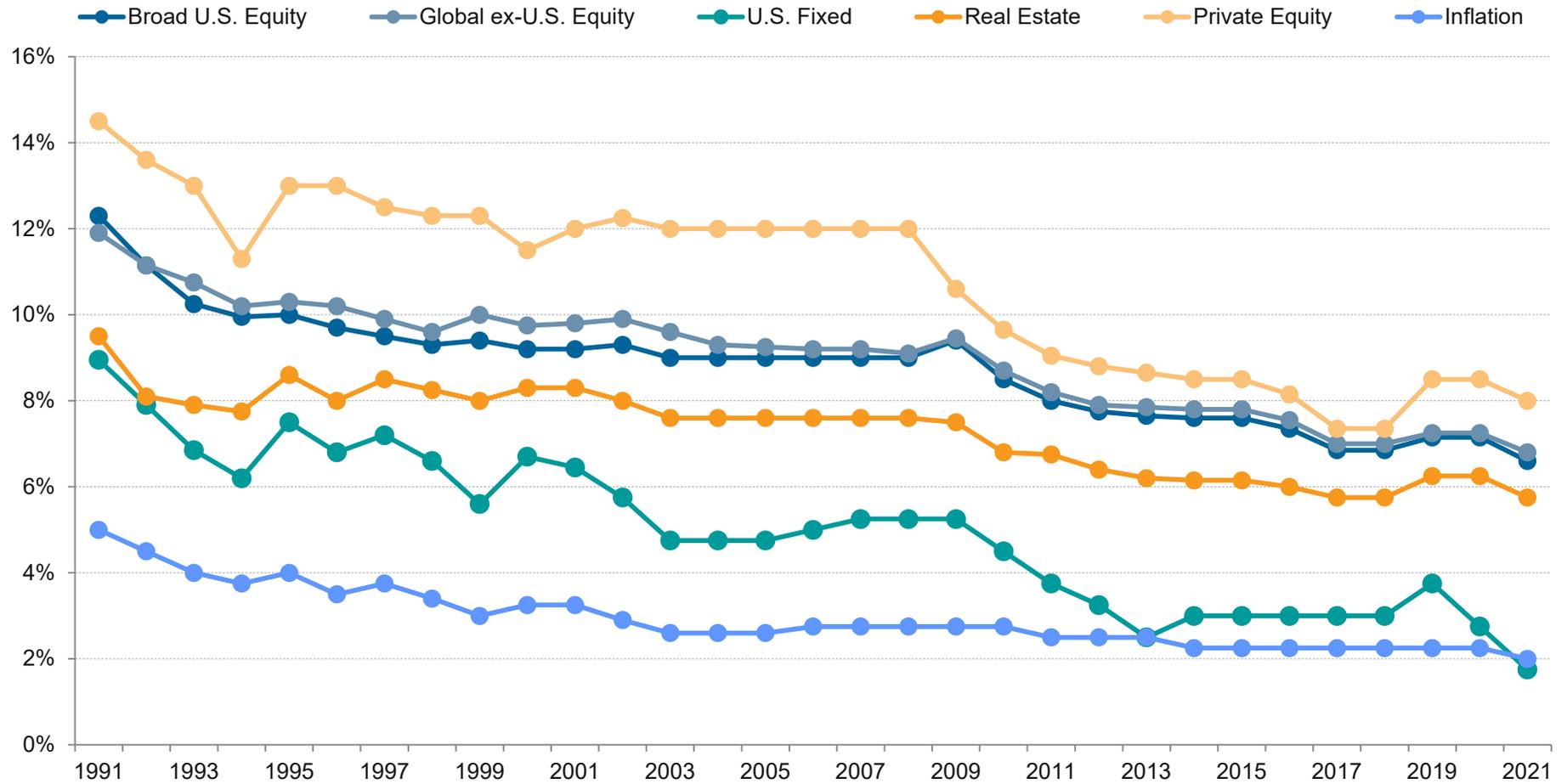
Our forecasts link expected return to risk

For example, investors demand a greater return from private equity than public equity as compensation for higher risk

Source: Callan

Return Projections: Major Asset Classes

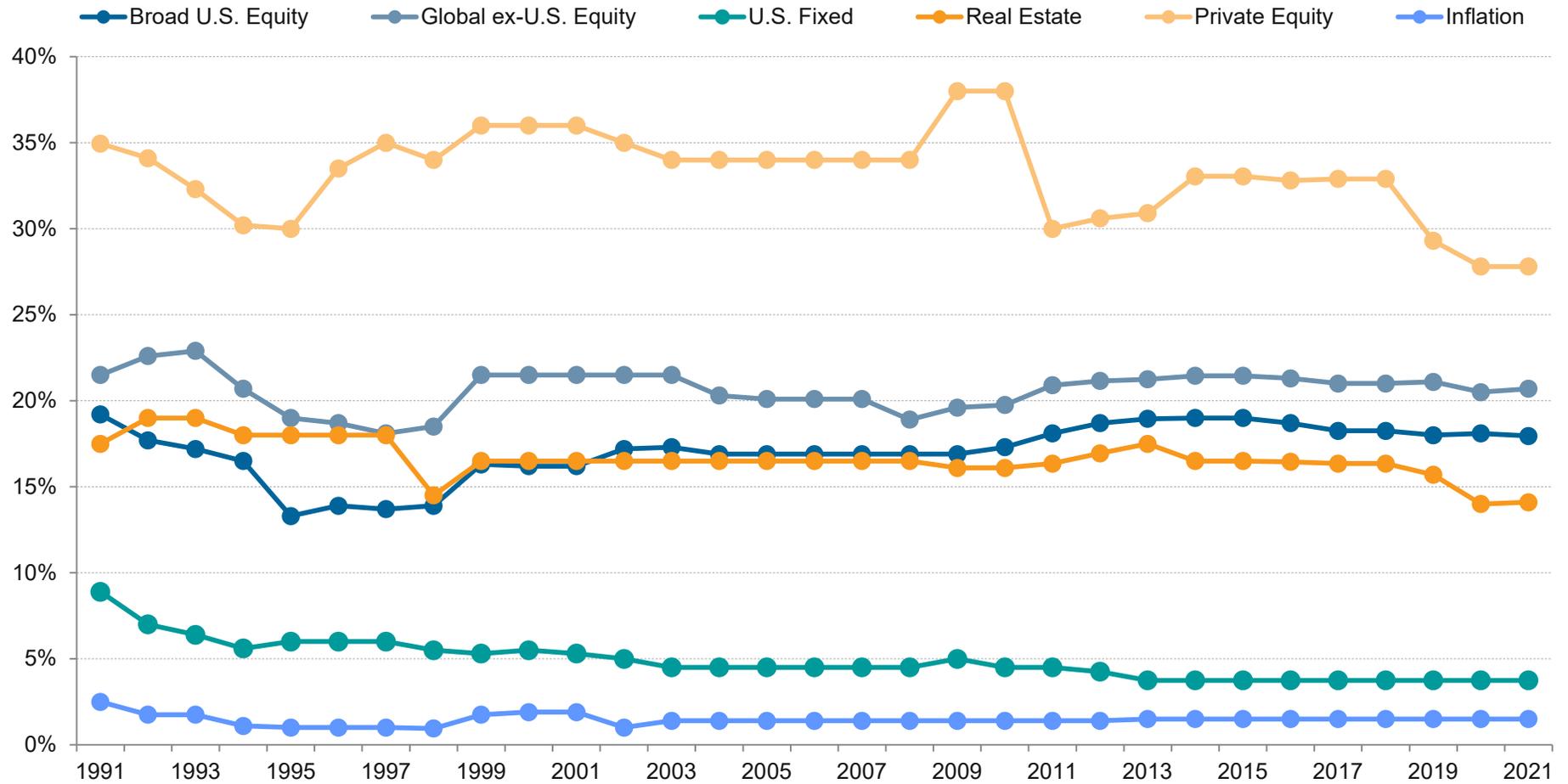
1991–2021



Source: Callan

Risk Projections: Major Asset Classes

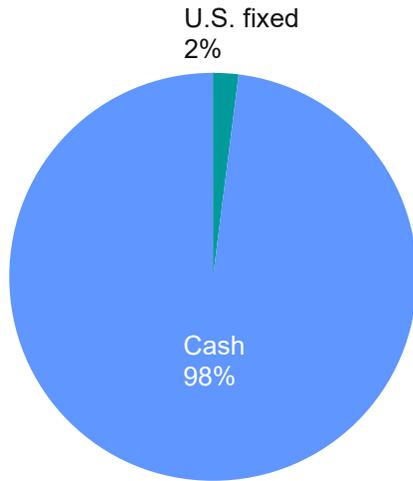
1991–2021



Source: Callan

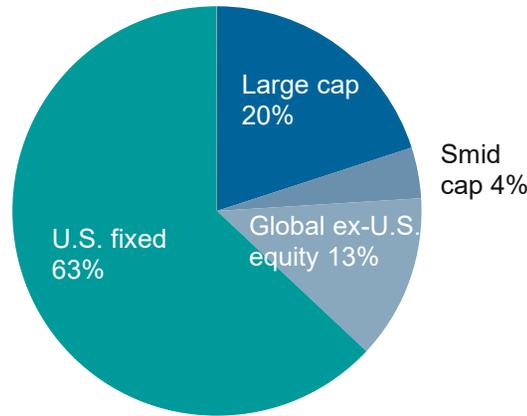
7% Expected Returns Over Past 30+ Years

Increasing Complexity →



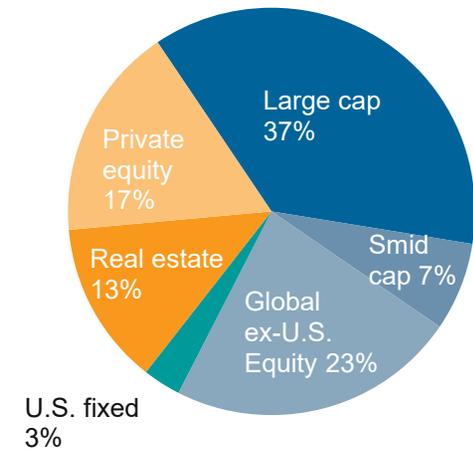
1991

Return: 7.0%
Risk: 1.1%



2006

Return: 7.0%
Risk: 6.7%



2021

Return: 7.0%
Risk: 17.3%

Increasing Risk →

In 1991, our expectations for cash and broad U.S. fixed income were 6.95% and 8.95%, respectively

Return-seeking assets were not required to earn a 7% projected return

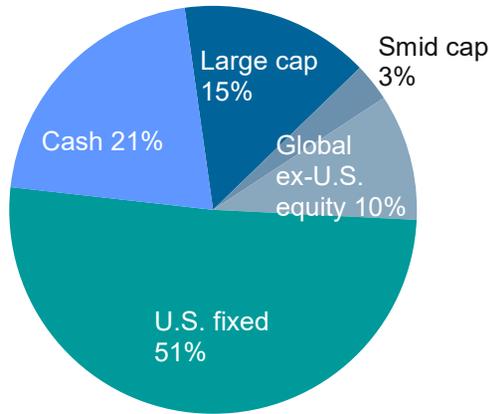
15 years later, an investor would have needed over a third of the portfolio in public equities to achieve a 7% projected return, with 6x the portfolio volatility of 1991

Today an investor is required to include 97% in return-seeking assets to earn a 7% projected return at almost 16x the volatility compared to 1991

Source: Callan

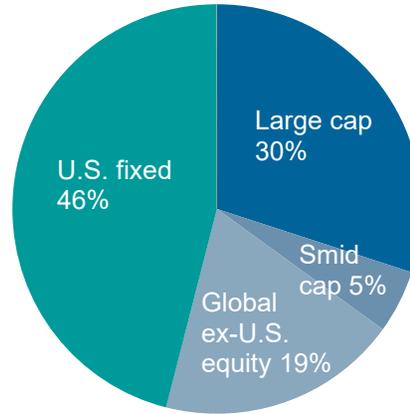
5% Expected Real Returns Over Past 30+ Years

Increasing Complexity →



1991

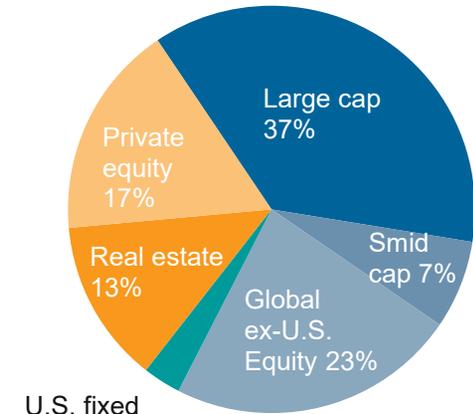
Inflation: 5.00%
Real Return: 5.0%
Risk: 6.6%



2006

Inflation: 2.75%
Real Return: 5.0%
Risk: 9.3%

Increasing Risk →



2021

Inflation: 2.00%
Real Return: 5.0%
Risk: 17.3%

Despite a 5% inflation projection, an investor could have almost three-quarters of the portfolio in low-risk assets (cash and fixed income) and still earn a 5% projected real return in 1991

15 years later, an investor would have needed over half of the portfolio in public equities to achieve a 5% projected real return

Today an investor must have 97% in return-seeking assets to earn a 5% projected real return at over 2.5x the volatility compared to 1991

Source: Callan

Customized ARMB Capital Market Projections – PERS & TRS Target

ARMB Asset Allocation Model 2021-2030

Asset Class	Target Weight	PROJECTED RETURN		PROJECTED RISK	
		1-Year Arithmetic	10-Year Geometric Return	Annualized Standard Deviation	Projected Yield
Public Equities	47.0%				
Broad US Equity	28.0%	8.00%	6.60%	17.95%	1.95%
Global Ex-US Equity	19.0%	8.70%	6.80%	20.70%	2.80%
Fixed Income	22.0%				
ARMB Core Fixed Income	22.0%	1.75%	1.70%	3.55%	2.43%
Opportunistic	6.0%				
Opportunistic	6.0%	5.45%	5.00%	10.60%	2.20%
Private Equity	12.0%				
Private Equity	12.0%	11.50%	8.00%	27.80%	0.00%
Real Assets	13.0%	6.80%	6.10%	13.10%	4.35%
Real Estate	4.88%	6.60%	5.75%	14.10%	4.40%
Timber	1.30%	6.45%	5.50%	14.95%	3.70%
Farmland	3.25%	6.60%	5.60%	15.10%	4.25%
Private Infrastructure	2.28%	7.00%	6.00%	15.45%	4.60%
REITs	1.30%	8.15%	6.20%	20.70%	4.65%
Cash Equivalents	0.0%				
Cash Equivalents	0.0%	1.00%	1.00%	0.90%	1.00%
Inflation			2.00%	1.50%	
Total Fund	100.0%	6.90%	6.15%	13.56%	2.32%

Projection set customized to reflect specific ARMB strategies:

- Real assets, opportunistic and fixed income

Current target projected to generate a return of 6.15% compounded over 10 years, at a risk (standard deviation) of 13.56%. This return is down from 6.79% projected last year.

Source: Callan LLC

2021 Correlation Assumptions for Customized ARMB Asset Class Set

Correlation Matrix	Broad US	Large	SMID	Glb ex US	Int'l	Emerge	Dom Fix	ARMB Fix	Opp	Priv Cred	Priv Eq	Real A	RE	Timber	Farm	Infra	REITs	HF	Cash	CPI	
Broad US Equity	1.000																				
Large Cap US Equity	0.997	1.000																			
Small/Mid Cap US Equity	0.931	0.900	1.000																		
Global ex-US Equity	0.817	0.807	0.796	1.000																	
Developed ex-US Equity	0.781	0.770	0.770	0.980	1.000																
Emerging Market Equity	0.796	0.790	0.760	0.931	0.840	1.000															
Core US Fixed	-0.104	-0.099	-0.120	-0.123	-0.106	-0.140	1.000														
ARMB Fixed Income	-0.105	-0.100	-0.121	-0.124	-0.107	-0.141	1.000	1.000													
Opportunistic	0.986	0.990	0.887	0.793	0.758	0.773	0.042	0.042	1.000												
Private Credit	0.735	0.730	0.700	0.720	0.695	0.690	-0.060	-0.061	0.724	1.000											
Core Real Estate	0.708	0.705	0.663	0.674	0.660	0.629	-0.035	-0.035	0.703	0.560	1.000										
Timber	0.699	0.695	0.660	0.663	0.640	0.635	-0.020	-0.020	0.695	0.540	0.640	1.000									
Farmland	0.705	0.700	0.670	0.654	0.640	0.610	-0.100	-0.101	0.689	0.520	0.590	0.600	1.000								
Private Infrastructure	0.722	0.720	0.670	0.694	0.680	0.645	0.010	0.009	0.724	0.520	0.760	0.630	0.600	1.000							
US REITs	0.803	0.790	0.795	0.787	0.765	0.745	-0.110	-0.110	0.778	0.620	0.695	0.620	0.630	0.630	1.000						
Real Assets	0.845	0.839	0.800	0.804	0.785	0.753	-0.061	-0.061	0.834	0.643	0.914	0.774	0.818	0.858	0.821	1.000					
Hedge Funds	0.783	0.780	0.734	0.762	0.735	0.730	0.142	0.141	0.803	0.610	0.520	0.530	0.540	0.474	0.620	0.622	1.000				
Private Equity	0.803	0.798	0.760	0.783	0.760	0.743	-0.190	-0.190	0.774	0.680	0.600	0.600	0.600	0.620	0.750	0.730	0.602	1.000			
Cash Equivalents	-0.064	-0.060	-0.080	-0.104	-0.100	-0.100	0.150	0.162	-0.039	-0.060	0.000	-0.010	-0.100	-0.070	-0.050	-0.052	-0.040	0.000	1.000		
Inflation	-0.013	-0.020	0.020	0.011	0.000	0.030	-0.250	-0.249	-0.056	0.060	0.100	0.020	0.010	0.055	0.120	0.076	0.150	0.060	0.050	1.000	

Source: Callan LLC

Expanding the Length of the Forecast Horizon

10-Year vs. Equilibrium Capital Market Expectations

- As the time horizon grows beyond 10 years, our capital market expectations increasingly incorporate “equilibrium returns”. Equilibrium returns reference **long-term historical mean results**, with an overlay of informed judgment. Key elements to consider:
 - Nominal returns
 - Inflation
 - Real returns
 - Risk premium – bonds over cash, stocks over bonds, long duration over short
 - Long-term underlying economic growth (real GDP)
- 10-Year expectations:
 - Large Cap Stocks: 6.5% nominal, 4.5% real, 4.75% premium over bonds
 - Bonds: 1.75% nominal, -0.25% real, 0.75 % premium over cash
 - Cash: 1.0% nominal, -1.0% real
 - Inflation: 2.0%
 - Underlying economic growth (real GDP) – 2 to 2.5% per year
- Equilibrium expectations:
 - Large Cap Stocks: 8.40% nominal, 6.4% real, 3.45% premium over bonds
 - Bonds: 5.1% nominal, 3.1% real, 2.05% premium over cash
 - Cash: 3.05% nominal, 1.05% real
 - Inflation: 2.0%
 - Underlying economic growth (real GDP) – 3% per year

As Time Horizon Increases, Expected Returns Increase

Transition from 10-Year to 20-Year Horizon – Heading Toward LT Equilibrium

AssetClass	2021-2030 10-Year Annualized Return	2021-2040 20-Year Annualized Return	2021-2050 30-Year Annualized Return	Long-Term Annualized Equilibrium Return	Projected Standard Deviation
Broad US Equity	6.60%	7.15%	7.60%	8.55%	17.97%
Large Cap US Equity	6.50%	7.05%	7.50%	8.40%	17.70%
Small/Mid Cap US Equity	6.70%	7.35%	7.95%	9.10%	21.30%
Global ex-US Equity	6.80%	7.40%	7.90%	8.90%	20.68%
Developed ex-US Equity	6.50%	7.05%	7.50%	8.35%	19.90%
Emerging Market Equity	6.90%	7.55%	8.20%	9.50%	25.15%
Core US Fixed	1.75%	2.65%	3.50%	5.10%	3.75%
ARMB Fixed Income	1.70%	2.60%	3.40%	5.00%	3.57%
Opportunistic	5.00%	5.70%	6.30%	7.45%	10.58%
Private Credit	6.25%	6.85%	7.25%	8.15%	14.60%
Core Real Estate	5.75%	6.30%	6.60%	7.40%	14.10%
Timber	5.50%	5.95%	6.35%	7.15%	14.95%
Farmland	5.60%	6.15%	6.45%	7.25%	15.10%
Private Infrastructure	6.00%	6.60%	7.05%	7.95%	15.45%
US REITs	6.22%	6.80%	7.20%	8.05%	20.70%
Real Assets	6.15%	6.65%	7.00%	7.85%	13.10%
Hedge Funds	4.00%	4.55%	5.00%	5.85%	8.00%
Private Equity	7.95%	8.30%	8.70%	9.60%	27.80%
Cash Equivalents	1.00%	1.60%	2.00%	3.05%	0.90%

Source: Callan LLC

Focus on 20-Year Horizon – PERS (\$19.6 b) & TRS (\$9.5 b at 12/31/20)

Achieve 4.88% Real Return over 20-Year Horizon

ARMB adopted new target portfolio following 2019 asset-liability study, refined in 2020

- Duration, cash flows and demographic forecasts suggest the investment time horizon for PERS and TRS remains long
- Current 10-year capital market forecasts can lead investors to take on substantial risk to meet a fixed return goal
- Extending the forecast horizon enabled the plans to moderate exposure to risk assets while still meeting the return target over this longer horizon
- New target altered the risk posture of the plans and acknowledged future liquidity needs

Portfolios optimized using broad US and non-US equity, broad US fixed income, real assets and private equity

- Opportunistic is modeled as 60/40 exposure to public market stocks and bonds
- Real assets modeled using current target weights to each component within the total real asset composite
 - 37.5% *Real estate*
 - 10% *Timber*
 - 25% *Farmland*
 - 17.5% *Private Infrastructure*
 - 10% *REITs*

Fixed income modeled as 95% broad market (BB Aggregate) and 5% cash

Focus on 20-Year Time Horizon

Compare Return and Risk for Diversified and Public Markets-Only Portfolios

- Target adopted in 2020 represents a portfolio designed to meet the goal of 7.13% nominal/4.88% real return over 20 years
- Lower 2021 assumptions suggest a nominal return gap of 35 basis points, but a real return gap of only 10 basis points
- Inflation assumption is 2.0%, down from 2.25% projected in 2020
- Actuary's effective long term real return target is 4.88%
- Target shown at right is expected to generate a long-term (20-year) return that is close to (but just below) the plan's real return target (6.78% - 2.00% = 4.78%)
- Target expected to generate a greater return for the same level of risk as a portfolio restricted to the public markets

	2021 Projection	2020 Projection
Broad US Equity	28	28
Global ex-US Equity	19	19
ARMB Fixed Income	22	22
Opportunistic	6	6
Real Assets	13	13
Private Equity	12	12
Totals	100.00	100.00
Projected Arithmetic Return	6.90%	7.51%
10-year Compound Return	6.15%	6.79%
Projected Standard Deviation	13.56%	13.55%
Projected Arithmetic Return	7.50%	7.83%
20-year Compound Return	6.78%	7.13%
Projected Standard Deviation	13.56%	13.55%
Real Return (2% inflation)	4.78%	4.88%
Equity	59%	59%
Inv Grade Fixed	22%	22%
Alts	25%	25%

Source: Callan LLC

Disclaimers

This report is for informational purposes only and should not be construed as legal or tax advice on any matter. Any decision you make on the basis of this content is your sole responsibility. You should consult with legal and tax advisers before applying any of this information to your particular situation.

This report may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact.

Reference to or inclusion in this report of any product, service or entity should not be construed as a recommendation, approval, affiliation or endorsement of such product, service or entity by Callan.

Past performance is no guarantee of future results.

The statements made herein may include forward-looking statements regarding future results. The forward-looking statements herein: (i) are best estimations consistent with the information available as of the date hereof and (ii) involve known and unknown risks and uncertainties such that actual results may differ materially from these statements. There is no obligation to update or alter any forward-looking statement, whether as a result of new information, future events or otherwise. Undue reliance should not be placed on forward-looking statements.

The Callan Institute's mission is to improve the best practices of the institutional investment community through research, education, and dialogue.

Follow us for notifications about our latest research and events



Twitter: @CallanLLC



LinkedIn: Callan

ALASKA RETIREMENT MANAGEMENT BOARD

Risk Management

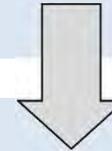
March 2021

Shane Carson, CAIA, CFA
State Investment Officer

Key Board Decisions

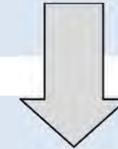
Determine Investment Objective

- Fund's Purpose
- Governance – who makes which decisions?



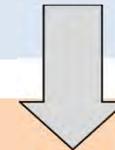
Determine Asset Allocation

- Strategic
- Tactical



Oversee Implementation

- Manager Structure – number and types of manager allocations.
- Manager Selection



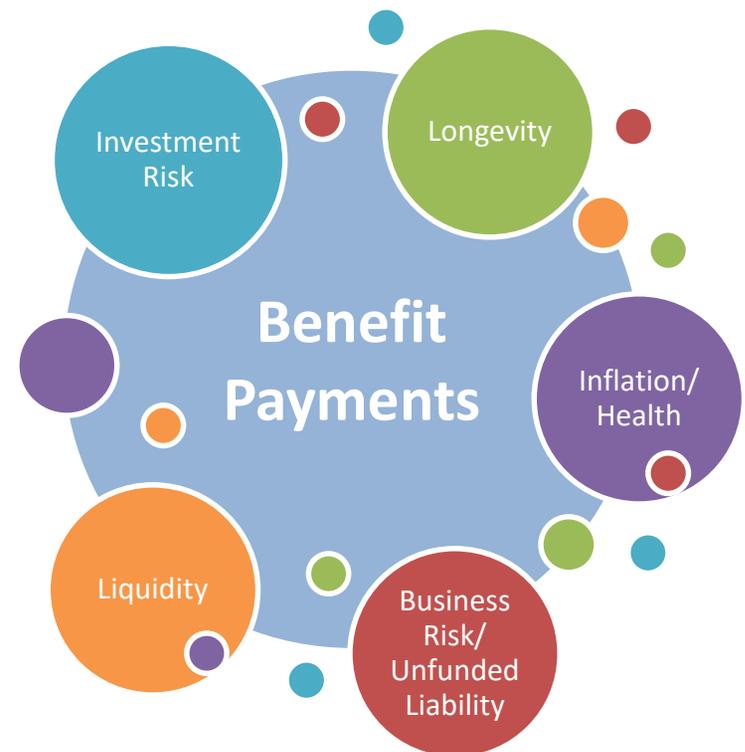
Monitor Results

- Are the fund, asset classes and mandates performing as expected?
- Are they achieving objectives?

Risk and the Retirement System?

What does risk mean to the ARMB?

- At its most comprehensive, risk is anything that could impact the objectives of the retirement systems.
- The defined benefit systems' primary objective is to pay all benefits when they are due.
- Risk encompasses both assets and liabilities.
- Defined benefit systems are designed to be able to take risks – pooling market, longevity, and other risks across time and a broad pool of participants.
- Setting and monitoring investment risks is one of the primary roles of the ARMB.

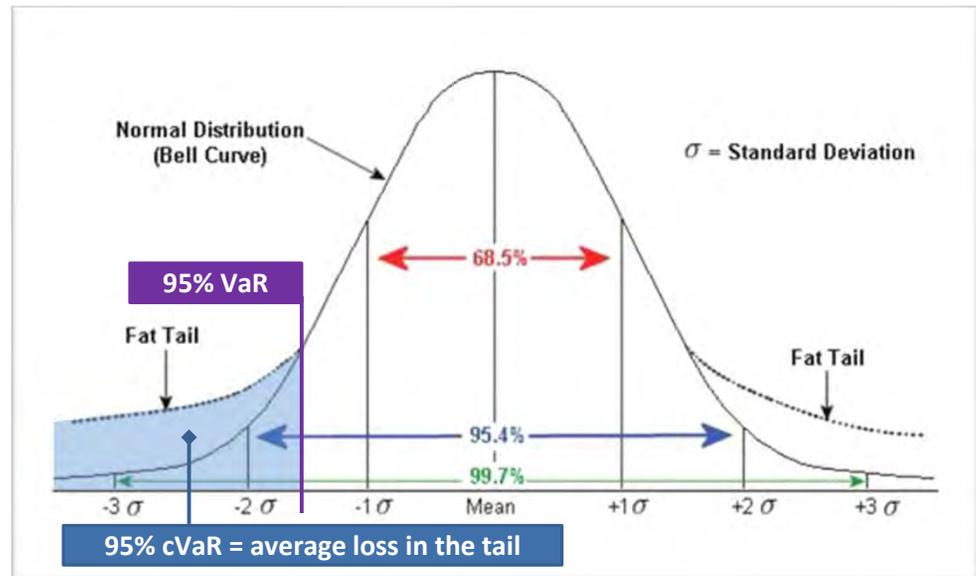


Risk Monitoring Tool: truView

- The ARMB is using truView for portfolio risk analytics. truView is State Street Global Exchange's risk measurement platform.
- truView analytics are run every six months and the current results are as of December 31, 2020.
- We use truView to help answer the following questions:
 - Is the portfolio risk positioned according to the ARMB's asset allocation?
 - What is the probability and magnitude of potential losses?
 - Is the ARMB taking more or less risk than the strategic benchmark by asset class?
 - Are specific investment mandates or managers adding to or reducing risk?
 - Does the ARMB have unexpected risk exposures or concentration?
 - How would the ARMB's current portfolio perform in historic market events or scenarios?

What is Value-at-Risk?

- Value-at-risk (VaR)
 - A commonly used measure of potential loss.
 - VaR is the maximum expected loss with a specific frequency over a given time horizon.
 - VaR can be estimated parametrically using the mean and standard deviation, but this ignores fat tails (kurtosis, skewness).
 - VaR also can be estimated using historic market information, which includes past fat tails – this is the approach truView takes.
- Expected shortfall (conditional VaR or cVaR) is the average loss contained in the left tail.
- Why are VaR and cVaR important?
 - They quantify the risk of loss for the portfolio.
 - VaR differences between historical and parametric provide insight into fat tails.



Volatility Decomposition

- Total portfolio volatility is dominated by public equities at 63%.
- Public and private equities contribute 79% of total volatility.
- Little change in overall volatility from June.
- Portfolio volatility in December is 12.9% which is lower than forward expectations of 13.6% determined by the fiscal year 2021 asset allocation.

Volatility Decomposition 6/30/2020				
	Market Value (Millions)	Allocation (%)	Volatility ¹ (% per annum)	Volatility Contribution (% of Total Vol)
Broad Domestic Equity	7,530	28.4%	16.8%	37.2%
Global Equity Ex-US	5,041	19.0%	16.9%	24.8%
Real Assets	3,612	13.6%	14.4%	13.0%
Broad Fixed Income	5,903	22.2%	3.3%	4.6%
Private Equity	3,000	11.3%	16.8%	14.9%
Opportunistic	1,472	5.5%	12.8%	5.6%
TOTAL	26,557	100.0%	12.6%	100.0%

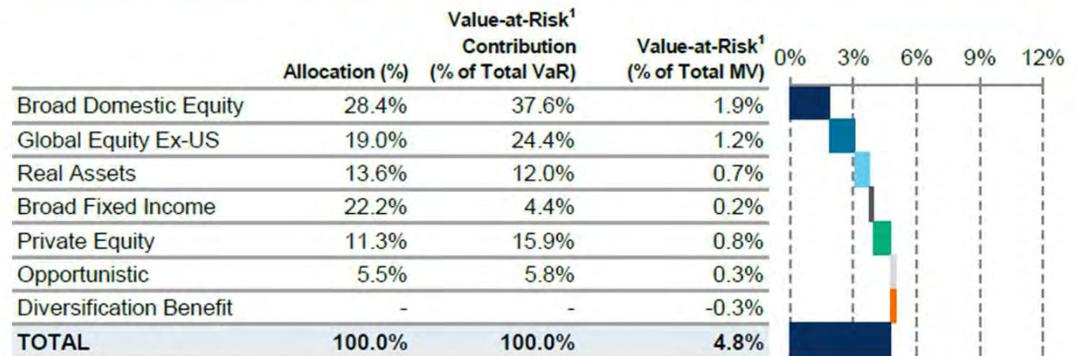
Volatility Decomposition 12/31/2020				
	Market Value (Millions)	Allocation (%)	Volatility ¹ (% per annum)	Volatility Contribution (% of Total Vol)
Broad Domestic Equity	8,501	28.1%	17.9%	38.4%
Global Equity Ex-US	5,888	19.5%	16.7%	24.8%
Real Assets	3,753	12.4%	15.1%	12.2%
Broad Fixed Income	6,574	21.8%	2.4%	2.4%
Private Equity	3,654	12.1%	17.0%	15.7%
Opportunistic	1,840	6.1%	13.9%	6.5%
TOTAL	30,208	100.0%	12.9%	100.0%

Volatility at the asset class level is calculated using parametric Value-at-Risk at 84th percentile, expressed as a percentage of the market value of each asset class.

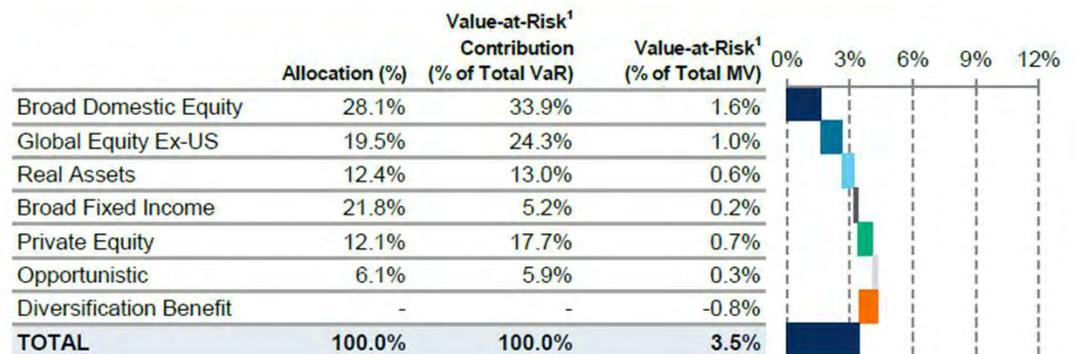
Asset Class Risk & Diversification

- The monthly value-at-risk is 3.5%.
- Broad Domestic Equity and Global Equity Ex-US contributed 58% of the VaR for 12/31/2020, down from approximately 62% at 6/30/2020.
- Overall, the asset class diversification benefit increased slightly in December's report due to a decrease in cross asset class correlations.

Asset Class Risk & Diversification 6/30/2020



Asset Class Risk & Diversification 12/31/2020



Equity Beta

- Equity Betas are within expectations for 12/31/2020.
- ARMB's domestic and Global ex-US portfolios should closely parallel their respective benchmarks.

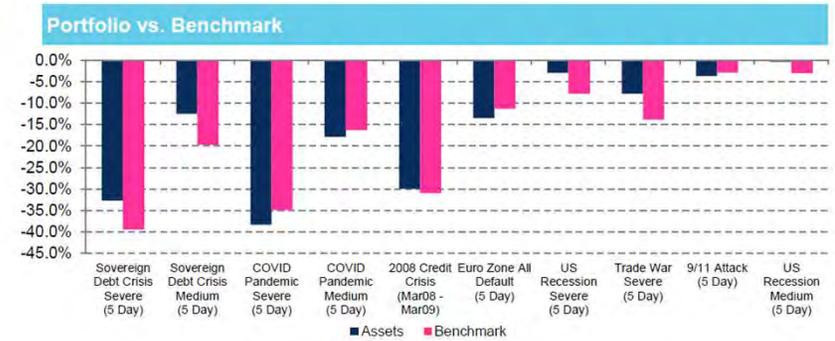
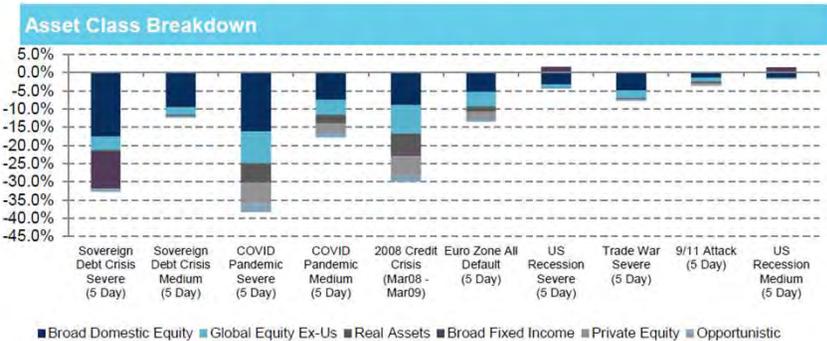
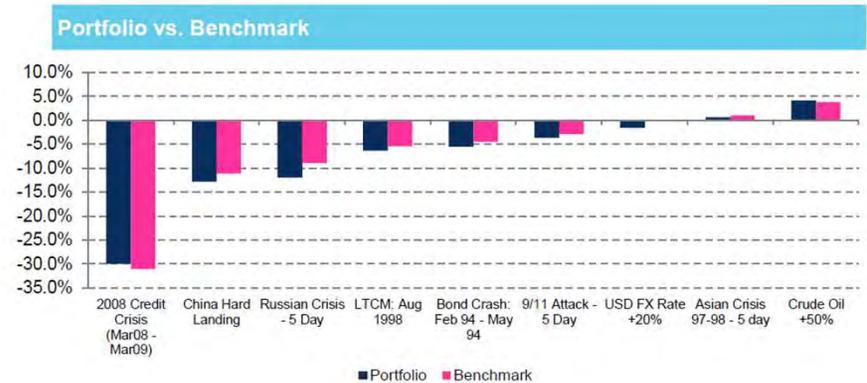
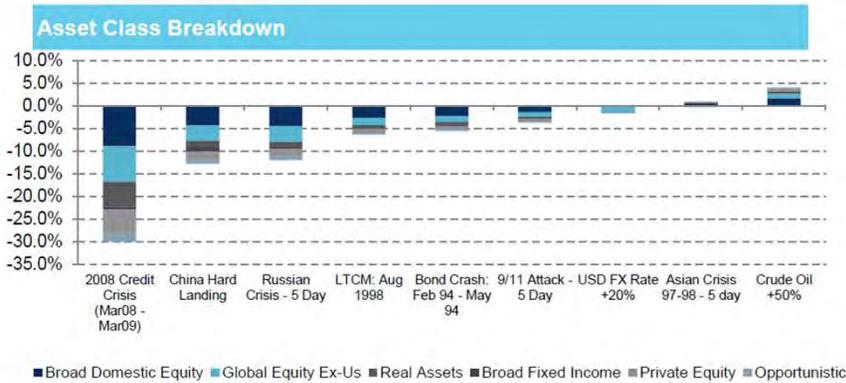
Sub Asset Class Beta Analysis

Asset Class / [Benchmark]	Market Value (Millions)	Allocation (%)	Beta ¹ 1Y to the Benchmark	Beta ¹ 5Y to the Benchmark
Broad Domestic Equity / [Russell 3000]	7,530	59.9%	0.96	0.97
Large Cap Pool (AYQK)	6,921	55.1%	0.93	0.95
Small Cap Pool (AYQC)	609	4.8%	1.29	1.24
Global Equity Ex-US / [MSCI ACWI Ex US IMI]	5,041	40.1%	0.96	0.96
Emerging Markets Pool (AYSC)	872	6.9%	0.91	1.02
IE Large Cap Pool (AYRC)	4,169	33.2%	0.96	0.95
TOTAL Equity / [MSCI ACWI]	12,571	100.0%	0.98	0.99

1. Beta is the regression coefficient generated by a linear regression of the percent return time series of position on an explanatory time series. This explanatory time series is often composed of the returns from a broader market index, the Benchmarks of each of the Equity Asset Classes.

Stress Tests

- Stress tests reveal no significant underperformance expectations versus the target benchmark.



Summary

- Overall, risk metrics were within expectations.
- Portfolio volatility and value-at-risk is mainly driven by equities which is normal given the riskier growth nature of the asset class.
- TruView models several historical and predictive scenarios. ARMB's relative performance given the scenarios is mixed but no scenario forecasts significant underperformance from the benchmark.

Investment Discussion

Potential asset allocation approaches:

1. Increase risk tolerance
2. Give liquidity
3. Explore additional beta
4. Add alpha
5. Further reduce costs
6. Add leverage
7. Adjust return expectations

	Assets	Risks
Lower -->	Fixed income/Cash	Interest rate/duration/curve structure risk
		Sector risk
		Credit/counterparty risk
Risk/Time -->	Equities	Security Selection
		Liquidity
		Leverage
Higher <--	Alternatives	Beta or systematic risk
		Other risk factors
		Active risk/security selection
		Beta or systematic risk
		Liquidity
		Complexity
		Leverage

<u>Asset Class</u>	<u>Allocation</u>
Broad Domestic Equity	28%
Global Equity Ex-US	19%
Fixed Income	22%
Opportunistic	6%
Real Assets	13%
<u>Private Equity</u>	<u>12%</u>
Total	100%

ALASKA RETIREMENT MANAGEMENT BOARD (ARMB)

SUBJECT: ARMB Actuarial Committee Charter ACTION: X
DATE: March 18, 2021 INFORMATION: _____

BACKGROUND:

The Actuarial Committee approved a draft of the charter at its April 22, 2015 meeting, with the intent that the charter be adopted by the Alaska Retirement Management Board.

ARMB Legal Counsel Stuart Goering reviewed the draft charter and provided suggested revisions on May 7, 2015.

STATUS:

Mr. Goering's revisions have been incorporated into the draft charter presented for review to the March 17, 2021 Actuarial Committee for consideration.

RECOMMENDATION:

The Alaska Retirement Management Board adopts the Actuarial Committee Charter as presented.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: ARMB Third Actuary Audit Procurement ACTION: X
DATE: March 18-19, 2021 INFORMATION: _____

BACKGROUND:

AS 37.10.220(a)(10) provides that the Alaska Retirement Management Board (the Board) shall contract for an independent audit of the state's actuary not less than once every four years. Upon research and discussion with legal counsel, this statute does not preclude the review actuary, currently Gabriel Roeder Smith (GRS), from performing the independent audit of the state's actuary. Further, the Board may conduct a sole source procurement per 15 AAC 112.160, for the independent audit of the state's actuary if accompanied by a written explanation as to why a procurement from a source is in the best interest of the beneficiaries of the pension funds.

At its December meeting, the Board directed staff to pursue a sole source procurement contract with GRS and concurrently manage an expression of interest process for an independent audit of the state's actuary, focused solely on recent valuation reports.

STATUS:

A Request for Interest (RFI 04-001-21) was issued February 12, 2021 and closed March 1, 2021. A total of two responses were received.

GRS submitted a proposal outlining their 10-year history as the ARM Board's review actuary, and fee for conducting the independent audit.

Staff reviewed the RFI submissions and GRS' proposal and have determined that a sole source procurement contract with GRS is in the best interest of the beneficiaries of the pension and benefits funds due to its longstanding experience with the plans and low cost proposal.

RECOMMENDATION:

The Alaska Retirement Management Board directs staff to proceed with a sole source procurement contract for an independent audit of the state's actuary, focused solely on recent valuation reports, with GRS since it is in the best interest of the beneficiaries of the pension funds for the reasons set forth in previous Actuarial Committee discussions and as documented herein.

PUBLIC COMMENTS:

Public comment was given by the following people on March 18, 2021:

1. Doug Woodby (Verbal)
2. Dick Farnell (Verbal)
3. Jim Simard (Verbal)
4. Elaine Schroeder (Verbal)
5. Bob Schroeder (Verbal)